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REPORTS

OF THE

INSPECTORS OF MINES

OF THE

ANTHRACITE COAL REGIONS OF PENNSYLVANIA,

FOR THE

YEAR 1880.

HARRISBURG:
LANE S. HART, STATE PRINTER.
1881.

VIRTUE
LIBERTY AND
INDEPENDENCE

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REPORTS

OF THE

INSPECTORS OF MINES

OF THE

ANTHRACITE COAL REGIONS OF PENNSYLVANIA,

FOR THE YEAR 1880.

POTTSVILLE, SCHUYLKILL COUNTY, PA., *March 14, 1881.*

To His Excellency HENRY M. HOYT,

Governor of Pennsylvania:

SIR : In accordance with the provisions of the second section of the act of 2d day of June, A. D. 1871, I have the honor of herewith submitting the following report of the office of clerk of the mining district of Schuylkill for the year ending 31st December, 1880, together with consolidated and comparative tables of production of coal, number of employés and fatal and non-fatal casualties which are severally given in the reports of the respective inspectors of each division of the district in detail and hereto attached.

The term for which Samuel Gay, inspector of Shenandoah division, and that of Sampson Parton, inspector of Pottsville division, were commissioned, expired on the 22d day of Sptember last. The first was re-commissioned for another term and assigned to Pottsville division. Robert Mauchline was commissioned in place of latter gentleman, for term commencing on date above named, and assigned to Shenandoah division.

Mr. Parton's health for some months prior to the expiration of his term of office, had been failing, so much so as to render him unable to make any extended examination of mines, and necessitating his employment of a deputy, upon whose reports he was compelled to rely. His health continued to fail until 26th of January; when his disease (dropsy) resulted in death. Mr. Parton was a gentleman very much respected for his varied attainments and superior knowledge of mines and mining. His decease is regretted by a large circle of sincere friends.

The monthly reports to the court commenced May, 1879, as ordered by the court, March, 1879, have been made regularly throughout the year, but regret to state that they were not as accurate or reliable as it is desirable they should be.

Owing to refusal of some operators and failures of others to furnish their monthly tonnage, we have been compelled to rely to some extent upon copies of weekly scale reports sent to newspapers for the tonnage of these collieries; these, in some instances are liable to be duplicated. and with others who ship coal east and west we frequently only receive the eastern shipment, so that the reports of tonnage for each month lack that accuracy they should have. These reports could be made to serve the interests and be of the very greatest advantage to those engaged or interested in the production and sale of this valuable and important fuel, by having monthly an accurate statement of the coal shipped for the preceding month from each district, thus enabling them to make up tables of production and quantity marketed from month to month and thereby forming an important element in forecasting the future trade of the season.

In order that it may be possible to accomplish this much to be desired end, a tonnage blank has been prepared and will be forwarded monthly to each operator. which, if filled up and promptly returned, will enable me to issue early in the month a report perfectly accurate of the preceding month's shipments from each division of the district.

We desire to express our thanks to the coal companies and operators who have, by the information given, assistance rendered, and courtesies extended, materially aided us in the discharge of our duties, and with an earnest desire that these pleasant relations of the past may ever continue in the future.

The expenses for year 1880 for office rent, light, fixtures, postage, and incidental expenses of clerk's office, with stationery of the several inspectors and clerk's office, for which vouchers were returned to Auditor General's office, amounted to $598 00.

Total amount coal shipped to market, Pottsville district, ...	1,367,531.06	
Consumed or sold at colliery, ...	93,549.11	
		1,461,070.17
Total amount coal shipped to market, Shenandoah district, ...	3,543,663.04	
Consumed or sold at colliery, ...	210,122.10	
		3,753,785.14

Total amount coal shipped to market, Shamoken district,	3,285,216.15	
Consumed or sold at colliery,	176,155.03	
		3,461,371.18
Total production of Schuylkill district,		8,676,228.09
Decrease for 1880,		1,382,027.07
Total number employés, First, or Pottsville division,		6,913
Total number employés, Second, or Shenandoah division,		11,471
Total number employés, Third, or Shamokin division,		11,616
Total number employés entire district,		30,000
Increase for 1880,		1,584
Average days worked by breaker, First division,		$151\frac{3}{4}$
Average days worked by breaker, Second division,		$175\frac{1}{2}$
Average days worked by breaker, Third division,		$174\frac{1}{2}$
Average in entire district,		$167\frac{1}{4}$
Total fatal casualties, Pottsville division,		15
Total non-fatal casualties, Pottsville division,	129	
Total fatal casualties, Shenandoah division,		39
Total non-fatal casualties, Shenandoah division,	92	
Total fatal casualties, Shamokin division,		34
Total non-fatal casualties, Shamokin division,	124	
Totals,	345	88
Total fatal and non-fatal,		433
Ratio of tons per life lost,		98,593 10
Ratio of tons per person injured,		25,148 09
Ratio of employés to each life lost,		$340\frac{10}{11}$
Ratio employés to each person injured,		87
Total number of tons of coal, fire clay, iron stone, and shale mined in Great Britain and Ireland, as per report of 1879,		145,366,369
Of which there was tons of coal,		133,720,393
Total number of employés,		476,810
Total number of accidents,		782
Total number of deaths from above accidents,		973
Number of tons coal mined to each life lost,		137,431
Number of employés to each life lost,		490

The English mines report for 1879 is taken for comparison, as being the latest received.

Very respectfully, &c.,

EDWARD J. GAYNOR,

Clerk Mining District of Schuylkill

FIRST DISTRICT.

OFFICE OF INSPECTOR OF MINES,
POTTSVILLE, PA., *March 7, 1881.*

To His Excellency, HENRY M. HOYT,
Governor of Pennsylvania:

SIR: In compliance with the act of Assembly of 3d March, 1870. requiring annual reports of the proceedings of inspectors of anthracite mines, I have the honor of herewith submitting my first annual report for the First or Pottsville district, and in connection with my successor, the sixth annual report for the Second or Shenandoah district of the mining district of Schuylkill, for year ending 31st December, 1880.

The term for which I was appointed and assigned to the Shenandoah division having expired on the 22d of September, and honored by a recommendation for re-appointment by the board of examiners, which was confirmed by a commission from Your Excellency for the ensuing term, with assignment to the Pottsville district.

Owing to change from Shenandoah to Pottsville district prior to the expiration of the year, and as several matters of grave importance occurred during my term in the former district, I have made a report for that district in connection with that of my successor. The accidents and tabulated statements are, however, given as one for the entire year, being embodied in those of my successor in the Shenandoah district, and for Pottsville district with those of my predecessor.

The Kehley Run mine fire and explosion of gas at Kohinoor colliery, with attendant loss of life, being occurrences of more than ordinary importance to the mining region, and requiring more than a simple notice, occurring, as they did, while I had charge of the Shenandoah district, I have deemed it incumbent upon me to give a detailed account of them in the report for that district.

The Pottsville district embraces all that part of Schuylkill county lying south of the north side of the Broad mountain, extending from the eastern to the western boundary of the county, a distance or length of forty-four miles, containing an area of about one hundred and fifty square miles within the coal limits, or nearly one third of the anthracite coal field. Notwithstanding the very large area of the district, yet the production is much less than that of any of the other districts.

There are over fifty collieries in operation within its limits, yet fully fifty per cent. are small or what is known as "land sale collieries," employing from two up to twenty persons each, and having a capacity for production ranging from five hundred up to ten thousand tons for each per annum. There are also quite a number of collieries throughout the district that have either been suspended or abandoned during the past depressed period in the coal trade, and more than likely to remain in that condition for some time to come.

In this district, for the year, there were fifteen accidents, resulting in the loss of the same number (fifteen) of lives, a decrease of nine from that of 1879, and attributable to the following causes:

Explosions of gas,	4
Premature explosions of blast,	1
Falls of coal, roof, &c.,	6
Mine cars,	2
Miscellaneous,	2
	15

One hundred and twenty-nine persons were injured, a decrease of twenty-nine from that of 1879. Many of those injured, however, were not of a serious character, and fully ninety-five per cent. were members of the Philadelphia and Reading Coal and Iron Company's beneficial fund.

Total number of tons of coal shipped to market,	1,367,531.06
Sold or consumed at mines,	93,509.11
Total out-put of coal,	1,461,070.17
Total number tons of coal produced in 1879,	1,855,164.00
Decrease for 1880,	394,093.03

Total number of employés,	6,913
Production of coal to each employé,	211.07
Ratio of one life lost to tons of coal produced,	97,404.14
Ratio of one person injured to tons of coal produced,	11,326.02
Ratio of one life lost to total employés,	461
Ratio of one person injured to total employés,	53½

When consideration is had of the number of years a large majority of the collieries have been in operation, and the great depth many of them have reached, it was an agreeable surprise, upon assuming charge of the district, to find them generally in fair condition, and much better than I had anticipated, although in some matters of the greatest importance there had been neglect. In four collieries the second outlet had been allowed to either close or from other causes of neglect become useless for the purposes for which such openings are required.

These evils have now been remedied, and I do not know of any colliery now in the district that has not a second outlet in such condition as to be available at all times for either egress or ingress.

The greater number of collieries in the district are working below water level, and more or less generate fire damp, and, as a precautionary measure of safety, the workmen are confined to the use of the Davy lamp, although in my examination I have not found any bodies of standing gas, (fire damp,) with exception of one colliery, nor detected the ventilating currents in return air courses as being charged with gas in sufficient quantity to be noticeable on the flame of the lamp, with exception of one colliery.

The precaution taken for safety in providing and using safety lamps is worthy of the highest commendation, and shall always receive my most earnest approval, as too great care and precaution cannot be exercised in fiery mines, and the opposite is more generally the rule than the exception in the anthracite region. Notwithstanding that it has been held by many that where safety lamps were used the ventilation has been more neglected than in other places where open lights were in use, yet in this district such has not been found to be the fact, but rather the contrary has been fully proven.

I have selected days when the barometer has been unusually low for the purpose of examining the return air currents in collieries where safety lamps were in use, and could not detect any cap on the flame of the lamp.

Through courtesy of A. B. Cochran, mining engineer, I am enabled to attach to my report a map of the anthracite region, showing the coal field in each county, and each inspector's district, with table of total tonnage for each year from commencement of shipments.

Very respectfully, &c.,
SAMUEL GAY,
Inspector.

Ventilation.

In all the collieries of any extent or importance in the district, ventilation is produced by means of fans, the majority of them being constructed on the Guibal principle.

The power is ample to furnish a copious supply of air, if all the other arrangements and channels whereby the currents are conducted to the ventilating machinery were constructed anywhere near the principles required by natural laws.

In this district, as in many others, the practice of carrying small airways, are noticeable, in some of the collieries very much so, thus preventing that full supply of air that would otherwise be secured. An important matter connected with the ventilation of the most fiery mines in the district is that where they strike a piece or section of coal where the usual amount of gas is not given off, the mine officials become neglectful and criminally careless in not carrying the air forward to the face of the several workings as required by the ventilation act.

In examinations made, I found places driven ahead of the brattice or air current a distance of from fifty to sixty feet, and this in the most fiery colliery in the region.

When remonstrated with for this unlawful and dangerous neglect the general excuse has been that no gas had been seen for several days or a week, &c., this excuse being considered sufficient to justify or exonerate them from all blame in case of accident, forgetful or ignorant of the fact that this lax discipline is the primary cause of fully ninety per cent. of the casualties in our mines.

Wherever this condition of things was found to exist demand was made upon the officers in charge to have it reformed and the workingmen restrained from working therein until remedied, or legal proceedings would be instituted against them for violation of the eighth section of the ventilation act.

Some few mine officials have taken exception to this, and held that I was exceeding my authority as inspector, and therefore deserving of censure. I have ever and always endeavored to avoid, as far as prudence would admit of, using the authority which the law has clothed me with, preferring to suggest or request rather than to demand the cessation of unsafe, unworkmanlike, and dangerous practices, although submitting to them, if not complied with, the alternative of answering before the court why they did not comply.

Explosions of C. H. gas.

Thirteen explosions of gas occurred in this district during the year 1880, by which four lives were lost and thirteen persons injured. Six of these accidents occurred since my assuming charge of the district, resulting in one death, and seven more or less injured. The explosion at Richardson colliery on morning of November 25th, by which two persons were seriously burned, one of whom died a few days later, was the result of gross neglect or carelessness on the part of the men injured, and loose discipline, combined with neglect, on the part of those in charge of colliery. It appeared from information elicited at examination that the fire boss had made his usual morning rounds, and that he had found gas in the working place of these men, viz: The chutes and cross-headings in West Daniel vein, near face of the gangway; the gas extending downwards about fifteen inches from the roof of the heading, and "tailing" outwards about twenty-five feet, ending in a feather edge.

That after completing his examination, he returned to a station near the foot of the slope, where he was accustomed to meet the men as they came to work, and there notify them of any danger that existed in any of their working places.

Upon this morning these two men passed the station on their way to work without having been noticed by the fire boss, and without on their part stopping to make any inquiry as to the condition of their working place, which prudence and a due regard for their own safety, as well as the requirements of the ventilation act, should have taught them to do.

It appeared that this was more the result of habit than of recklessness.

They proceeded, however, with others, to face of gangway, and one of them, having lighted his safety lamp, went up the chute to cross-heading, and commenced dressing down loose coal that had been loosened by a shot the day previous. Having observed the gas upon entering the working place, he hung his lamp near the bottom and below the level of the gas.

His "butty" had in meantime gone into the breast outside of the one they were working in, and the last working, two new breasts not working, or a distance of eighty feet, being between them.

This "butty," having completed a conversation had with the two men working in the breast, started to join his partner, going along cross-heading with an open light, and when about twenty-five feet from breast he had left, the gas exploded, burning him and his partner in a fearful manner, the latter injuries resulting fatally.

These men had violated the eighth section of the ventilation act, and were guilty of a misdemeanor in passing the lamp station as they did without making the necessary inquiries as to condition of working place; but, as heretofore stated, was more the force of habit than any mistake, showing a sad want of proper discipline in this mine. The boss is to be censured for not having the ventilating current carried or conducted up to the face of the workings, which he had failed or neglected to do, as by leaving three chutes open outside of where the explosion occurred, and thereby allowing the air to escape into the return before reaching the face of workings, fully sustaining the charges of neglect, carelessness, and want of proper discipline.

Underground Fires.

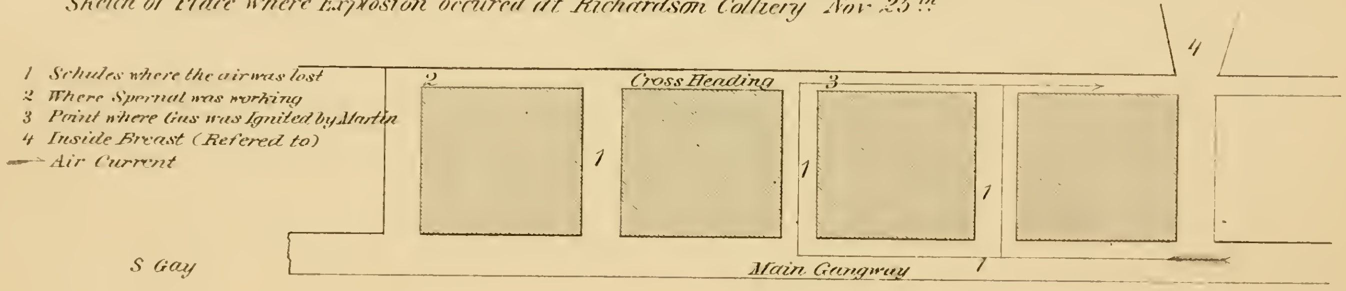
Two days after assuming charge of the Pottsville district, or on the 24th September, 1880, information reached me that fears were entertained by the officials in charge of Mine Hill Gap colliery that a fire existed in it, near the face of the East Daniel vein gangway, opened on middle lift. With the adverse experience had with the fire at Kehley Run mine, I determined on an immediate examination that no lives should be jeopardized here if in my power to prevent it; fortunately, however, no loss of life or serious accident has up to time of this writing (March 1st) occurred.

This mine is located in Greenbury valley, two miles northeast of the borough of Minersville, and operated by the Philadelphia and Reading Coal and Iron Company. It is opened on the north dip of the Mammoth vein by a slope which is down three lifts below water level or about 1,000 feet below the surface, on an angle of 65°.

The last time the slope was sunk, two lifts were opened with the design of operating both lifts at the one time; this, however, after an unsuccessful attempt to work them together, was found impracticable, owing to the steep angle and free character of the coal, and mining in the lower lift was temporarily abandoned.

Upon examining the mine, whatever doubts may have existed in regard to the fire, were quickly dispelled by seeing large volumes of fire rushing down one of the chutes into the gangway and also by looking through cross-heading in pillar, fire burning fiercely in breast.

Sketch of Place where Explosion occured at Richardson Colliery Nov. 25th


1 Schules where the air was lost
2 Where Spernal was working
3 Point where Gas was Ignited by Martin
4 Inside Breast (Refered to)
Air Current
Cross Heading
Main Gangway
1
2
3
4
S Gay

A force of men were engaged to make preparations to erect stoppings, consisting of wooden shells, the center filled in with clay, in gangways on the west side of the fire, with the purpose of cutting it off from the workings on that side and also for the purpose of hermetically sealing that portion of the mine where the fire exists.

However serious the results may be in the future, for the present, the fire fortunately exists in a part of the mine where but a small portion of the workings are exposed to its ravages, as on the east side it has a solid face of faulty ground to operate against, and on the west side a fifty feet pillar of coal extending the length of the first lift, or about three hundred feet.

Above this are the old workings which have been robbed out many years since.

In the gangways at this pillar the stoppings spoken of above have been erected.

The coal companies officers are now of the opinion that the fire has been extinguished through the means employed; this may be possible, but scarcely probable, from the fact that I do not believe it practicable to hermetically seal that part of the mine so as to cut off the air that supports combustion, hence my opinion that it is still burning, and fear that it will in the future cause great trouble and expense if not the abandonment of the colliery.

The basin on the south dip for a distance of four miles has been flooded for several years in consequence of underground fires, and yet in many parts thereof fire still exists.

IMPROVEMENTS.

Lehigh Nos. 10 and 11.

A new breaker erected, new machinery added for improving and increasing ventilation, a new slope sunk from second to third level with gangways, outlets, &c., complete.

New machinery for ventilation was also erected at Greenwood Slope No. 2 and breaker at No. 11 enlarged and improved.

Lincoln.

Inside tunnels were driven from No. 3 to Nos. 4 and 5 veins, a distance of two hundred and nineteen yards.

Kalmia.

Rock tunnel driven, cutting the No. 4 Lykens Valley vein overlying the No. 5 vein. The vein has three and a half feet of good coal.

East Lehigh.

Breaker improved by rebuilding pockets, erecting a new screen, putting in new rolls and necessary additional machinery.

General improvement made of inside track and workings, placing colliery in good condition for season of 1881.

Middle Lehigh.

A second lift in present workings has been opened and a new slope on Mammoth vein started.

Black Mine.

This colliery has not been worked for nearly two years past. The present operators commenced operations during the latter part of the summer, making general improvements in machinery and workings of mine that were required, erected a steam pump.

Palmer Vein.

Tunnel N, on third level below water level extends 186$\frac{2}{3}$ yards. Air hole driven to surface from third level, west gangway on Charley Pott vein, and 12-feet fan, with upright engine, erected in connection therewith. Palmer slope and west gangway Palmer vein to long tunnel re-timbered. Dirt plane and engine erected. An air hole started on what is believed to be the Peach Mountain vein cut by the long tunnel north from the Palmer vein on third level below water level.

Long tunnel is now driven 400 yards.

REGISTER OF FATAL CASUALTIES

Dates.	Names of Persons Injured Fatally.	Occupation.	Name of the Collieries.	Age.	Married or Single.	Child'n.	Remarks.
Jan. 21	Luke McGerity, . .	Miner, . . .	Eagle Hill Shaft, .	45	Married,	5	In the act of firing a shot, a piece of coal fell, fracturing his skull, causing death on 28th inst.
Feb. 9	Patrick Brennan, .	Miner, ...	Eagle Hill Shaft, . .	30	Single, .		Explosion of gas. Deceased went into chute with naked light, igniting gas and fatally burning him.
Mar. 15	Joseph Dix, ...	Driver boy, .	Wadesville, ...	15			Fell from front end of empty wagon on which he was riding and dragged underneath, injuring him internally.
April 21	Thomas Rhoades, .	Miner, ...	Phœnix Park No. 2,	54	Married,	3	Fall of slate in breast. Deceased had been ordered by inside boss to place a prop to prevent fall, but as the next day was to be an idle one he concluded to defer obeying order until then, with above fatal result.
2	John Owens, . . .	Engineer, . .	Gate Vein, ...	55	Married,	2	Supposed to have fallen off wagon that was being hoisted, receiving injuries causing immediate death.
28	John Williams, . .	Miner, ...	Lower Rausch Creek,	56	Widower	5	Premature explosion of blast, inflicting injuries from which he died on 30th.
May 10	Patrick Rooney, .	Boy, ...	Wadesville, ...	14			Drowned in sump. Upon descending shaft with his father to go to work in the mine is supposed to have lost his way and walked into sump.
17	Edward Murphy, .	Miner, . . .	Thomaston, ...	46	Married,	9	Fall of top coal. Deceased and "butty," John Horan, had drilled a hole and were tamping it preparatory to firing a shot, when without any previous indications (having sounded the top and considered it safe before commencing work) of danger, a large mass of top coal fell, burying both beneath it. Murphy was instantly killed, and Horan severely injured.
26	William Morgan, .	Miner, ...	Richardson, ...	50	Married,	6	Explosion of gas. Died from injuries on May 30.
July 13	John Bonawitz, . .	Miner, ...	Lincoln, ...	53	Married,	9	Fall of slate. Was engaged robbing pillar in breast 64, east side gangway, No. 2 slope, and while endeavoring to prevent fall it occurred, causing instantaneous death.
28	Joseph Briggs, . .	Bottom man,	Swatara, ...	19	Single,		Deceased and two other men were pushing a loaded wagon in back switch or slope bottom. While a loaded wagon was being hoisted on the slope, when loaded wagon was about being landed on top of slope, the rope broke, the wagon descending to bottom. Coal from wagon struck deceased, breaking his leg, the inflammation of which caused death on August 5.
Sept. 13	Thos. J. Williams,	Miner, ...	Pottsville, ...		Married,	6	Fall of slate and coal, receiving injuries from which he died on September 19.
13	William Morgan, .	Miner, ...	Lower Rausch Creek,		Married,	1	Explosion of gas. Deceased, with Isaiah Morgan, was working in breast 73, west. Deceased had fired a shot which ignited gas, causing explosion. From evidence given at inquest it appeared that the fire boss had examined this breast at about six o'clock in the morning, and found no gas as high as he could reach. The breast was worked up about 19 yards, and from 15 to 25 feet high. It also appeared in evidence that the superintendent of colliery had cautioned these men on the Saturday previous to accident to fire no shots, as it was dangerous and unnecessary, as small feeders of gas existed. Morgan died from injuries on September 26.
Nov. 13	Griffeth Lewis, . .	Laborer, . . .	Wadesville, ...	23	Single, .		Fall of slate at face of gangway.
25	Richard Sparnell, .	Miner, ...	Richardson, ...	26	Married,	1	Explosion of gas. Deceased was driving a chute in which considerable gas had accumulated during the night. He went to work in the morning without consulting fire boss. George Martin, his butty, coming into chute with naked light ignited the gas, burning both, and from effects of which Sparnell died on November 28.

REGISTER OF NON-FATAL CASUALTIES.

DATE.	Names of Persons Injured.	Occupation.	Names of the Collieries.	Remarks.
Jan. 2	John Palmer,	Repairsman,	Glendower,	Leg injured by prop falling upon it.
5	Michael Lawler,	Miner,	East Franklin,	Fall of piece of top coal; head and shoulders injured.
7	Daniel McGonigle,	do.	Wadesville,	Fall of piece of top coal; legs and chest injured.
12	David Watkins,	do.	do.	Dumping buggy; bar ran through his hand.
15	Bernard Larkin,	do.	Phoenix Park, No. 2,	Fall of piece of coal; two fingers cut off.
16	John Welsh,	Laborer,	do. do.	Caught between car and breaker; leg broken.
16	Moses Finley,	Bottom man,	Eagle Hill Shaft,	Struck by piece of coal; ribs broken and side bruised.
16	Daniel Conway,	Miner,	Otto,	Lamp of another workman accidentally ran into his eye, burning it.
19	Ralph Elliott,	do.	Wadesville,	Foot slipped while lifting a lump of coal; back severely sprained.
19	Jacob Redding,	do.	Eagle Hill Shaft,	Fall of piece of coal; foot broken.
22	Lewis Reese,	Laborer,	Lehigh C. & N. Co., No. 11,	Fall of slate; leg broken.
30	William Giles,	do.	Wadesville,	In trying to save himself from falling, struck his hand against sharp piece of coal, inflicting severe cut.
30	John Trainor,	Miner,	Eale Hill Shaft	Fell down chute from heading to gangway; skull fractured.
Feb. 5	John Larkin,	do.	Wadesville,	Top coal fell while undermining: ribs and side injured.
8	James Cavanaugh,	do.	Eagle Hill Shaft,	Standing prop against pillar, piece of coal fell; knee cut.
9	John Lloyd,	do.	do.	Explosion of gas.
14	Thomas Clore,	do.	Thomaston,	Barring coal from top piece of slate fell; foot injured.
14	Henry Williams,	Boss loader,	Wadesville,	Door of car fell; back injured; hand bruised; forefinger broken.
17	William Linsey,	Miner,	L. C. & N. Co., Foster's tun'l	Explosion of $\frac{2}{3}$ keg of powder; burned.
17	John McElhaney,	do.	do. do.	Explosion of $\frac{2}{3}$ keg of powder; burned.
23	Robert Gilgore,	do.	Phoenix Park, No. 3,	Fall of coal; head cut.
24	Martin Cummings,	do.	Wadesville,	Fall of coal; thigh broke.
24	John Reese,	do.	do.	Fall of slate; struck on side and rib broken.
24	George John,	do.	Pine Forest,	Fall of coal; head cut.
24	Francis Farrell,	do.	Lincoln,	Robbing pillar, piece of leg slate fell; side and back injured.
Mar. 2	William Davis,	Laborer,	Pottsville,	Fall of slate; head cut and bruised.
2	Michael O'Neill,	Miner,	Eagle Hill Shaft,	Fall of coal; injured internally.
3	Edward Grant,	Loader,	Glendower,	Struck on leg by piece of coal, breaking leg.
9	James Samons,	Miner,	Black Heath,	Fall of rock; leg broken.
18	James Edwards,	Laborer,	Mine Hill Gap,	Trimming end of gangway; axe slipped cutting toe off.
19	Joel Dinger,	Miner,	Colket,	Fall of coal; knocking him down, the chute injuring leg and side.
22	John McKenna,	Bottom man,	Eagle Hill shaft,	Head caught between wagons, and injured.

30	Alex Hart,	Miner,	Pine Forest,	Explosion of gas; hands and face burned.
Apr. 6	Martin Deegan,	Carpenter,	Anchor,	Fell from platform, a distance of 20 feet; foot and side injured.
12	John Muldowney,	Starter,	Mine Hill Gap,	Struck by piece of rock; leg broke.
13	Jeff Cauffield,	Miner,	Thomaston,	Explosion of gas; body injured.
15	Peter Keilman,	do.	L. C. & N. Co., No. 10,	Fell under empty cars in gangway.
15	Thomas F. Jones,	do.	do. do.	Fall of coal in breast, knee severely cut.
15	Thomas Wilson,	Laborer,	Pottsville,	Log fell on his foot and crushed it.
16	Daniel Oakman,	Top driver,	Wadesville,	Thumb caught between car wheel and sprag, and cut off.
16	John Murphy,	Driver,	Phœnix Park, No. 2,	Caught between wagons; breast injured.
17	Griff Smith,	Miner,	Wadesville,	Caught between coal and prop; arm broken; back hurt.
17	William McGee,	do.	Richardson,	Fall of coal; back and head injured.
20	William Weaklam,	Driver,	Pottsville,	Wagon ran over his leg injuring it severely.
26	Joseph Purcell,	Loader,	Phoenix Park, No. 2,	Caught between cars; collar bone broken.
28	Henry Eichenberg,	Timber man,	Beechwood,	Knee cut severely with an adze.
28	Henry Hughes,	Miner,	Wadesville,	Fall of piece of coal; head cut.
29	Dudley Gordon,	do.	do.	Fall of piece of coal; back and shoulder injured.
30	James Clemens,	do.	Lower Rausch Creek,	Fall of coal; arm broken.
30	Eronemus Houtz,	Gangway laborer,	Kalmia,	Fall of coal at face of gangway; back severely injured.
May 3	George T. Shaw,	Loader,	Colket,	Caught between loaded wagon and prop; hips injured.
7	Dennis Buckley,	Miner,	Pottsville,	Fall of slate; back and legs bruised.
4	William Edwards,	do.	Mine Hill Gap,	Piece of coal struck and injured eye.
13	William Watkins,	do.	Colket,	Blasting needle ran into foot.
14	James Churchill,	do.	L. C. & N. Co., No. 10,	Explosion of keg of powder; seriously burned.
14	Daniel Melarkey,	do.	do. do.	Fall of slate in breast; head and face cut.
17	William Brennan,	do.	Beechwood,	Fall of coal; head and face cut.
19	Howell Davis,	Door boy,	Richardson,	Fingers caught in cogwheels of fan and mashed.
24	George Wagner,	Dirt bank driver,	Glendower,	Fingers caught in wheel and mashed.
25	Michael McFadden,	Miner,	L. C. & N. Co., No. 8,	Struck by piece of timber while timbering cross-cut; injured in groin.
26	Thomas Wilson,	Driver,	Pottsville,	Kicked by a mule; head cut.
31	John V. Ryan,	Miner,	Thomaston,	Fall of piece of coal; head cut.
June 2	Nicholas Mosen,	do.	Beechwood,	Fall of coal; head and shoulders cut.
7	William E. Price,	Driver,	Wadesville,	Kicked by mule; nose broken and chin cut.
7	Nicholas Slobsky,	Laborer,	do.	Struck by piece of coal; artery on temple cut.
9	Thomas Keating,	Miner,	Glendower,	Struck by piece of coal; eye injured.
14	James Hayes,	Driver,	Beechwood,	Wagon ran over his finger, cutting it off at first joint.
21	Edward Quirk,	Bottom man,	Thomaston,	Jammed between mule and side of shaft; body bruised.
22	Henry Williams,	Boss loader,	Wadesville,	Mules running away, caught him between wagon and door frame; leg broken in two places and otherwise severely injured.
23	Joseph Hurst,	Miner,	Pottsville,	Explosion of gas; face and hands burned.
30	Daniel Evans,	do.	L. C. & N. Co., No. 10,	Fall of slate; ankle bone broken.

REGISTER OF NON-FATAL CASUALTIES—*Continued.*

DATE.	Names of Persons Injured.	Occupation.	Name of the Collieries.	Remarks.
July 1	Patrick Doyle,	Miner,	Beechwood,	Fall of rock; severely injured.
6	James Head,	do.	Wadesville,	Leg caught between lump of coal and prop; small bone broken.
10	Richard Jenkins,	Slate picker,	Black Heath,	Fell on iron plate, covering monkey rolls, his arm slipped through hole in plate, was caught by rolls drawing it in and crushing it up to shoulder.
12	William Slator,	Miner,	Beechwood,	Fall of coal; back and shoulder cut and bruised.
14	James Bergan,	do.	Mine Hill Gap,	Fall of coal; face, hands and shoulder bruised.
21	George Dress,	do.	Pottsville,	Fall of rock; foot crushed.
23	William Stirling, Sr.,	Platform man,	Swatara,	Lifting a shaft into truck; back sprained.
28	John Wilheldar,	Bottom man,	do.	Slope rope broke, which detached piece of rock that struck him on back injuring it.
Aug. 4	Edmund Edmunds,	Miner,	Thomaston,	Fall of piece of coal; finger broken.
12	Joseph Edwards,	Laborer,	Mine Hill Gap,	Fall of collar; head and hand injured.
16	John Barron,	Miner,	Pottsville,	Fall of coal; head cut.
18	Henry Deck,	Sawyer,	Wadesville,	Fall of pile of lumber; leg broken.
24	Joseph Bosche,	Miner,	Pine Forest,	Explosion of gas; hands and face burned.
24	Frank Smith,	do.	Pottsville,	Fall of slate; foot crushed.
31	Man Whalen,	do.	Eagle Hill Shaft,	Squeezed by lump of coal top of manway; ribs injured.
Sept. 2	William Dewalt,	Laborer,	Pine Forest,	Riding up dirt plane in wagon, the chain became detached, wagon ran to bottom of plane, cutting his leg off and otherwise injuring him.
2	Balzer Siegler,	Door tender,	L. C. & N. Co., No. 11,	Let cars come too close before opening door, was caught between doors and car; left arm badly cut; right arm bruised.
6	John Baker,	Miner,	Pottsville,	Fall of coal; foot crushed.
16	William Killian,	do.	L. C. & N. Co., No. 8,	Premature explosion of shot; cut in face.
22	Patrick Brennan,	"M," laborer,	Thomaston,	Struck by loaded wagon.
28	George Schum,	do.	Pottsville,	Explosion of gas; hands and face burned.
28	Engle Ruch,	Miner,	Lincoln,	Fall of slip coal from pillar at face; leg broken.
28	James McCreddy,	Driver,	Glendower,	Kicked by mule; leg injured.
Oct. 14	James Barrow,	Laborer,	L. C. & N. Co., No. 11,	Fell from a plank, a distance of 10 feet, while repairing elevator guides on breakers; breast and ribs injured.
16	Wm. Charlesworth,	Miner,	East Franklin,	Fall of slate; leg broken.
19	Albert Trainor,	Engineer,	Eagle Hill Shaft,	Explosion of boiler; face and hands cut and scalded.
20	Robert Shettlesworth,	Miner,	Glendower,	Fall of coal: ribs injured.
22	William Isaac,	Contract laborer,	do.	Explosion of gas; face and hands burned.
22	George Williams,	Miner,	do.	Explosion of gas; hand burned.

22	Patrick Gallagher,	Miner,	Wadesville,	Fell against brattice; two ribs broken.
23	John Withelder,	do.	Swatara,	Igniting a shot of dynamite; eyes injured.
27	Ben Howard,	do.	Wadesville,	Explosion of gas; face and hands burned.
27	Christ Shistle,	Laborer,	Wadesville,	Explosion of gas; face and hands burned.
28	Patrick Klahr,	Miner,	Thomaston,	Struck by lump of coal; hip hurt.
29	Moses Parkin,	do.	Wadesville,	Fall of piece of coal; knee fractured.
19	Patrick Hopkins,	do.	Phœnix Park, No. 3,	Taking timber up the breast, a shot fired in next breast blew through the pillar, cutting them about face and body seriously.
19	Michael Hopkins,	do.	Phœnix Park, No. 3,	
Nov. 4	Daniel Brennan,	do.	Thomaston,	Fall of piece of coal; thumb recently cut off.
9	Thomas Maley,	do.	Otto,	Fall of slate; back and leg injured.
11	John McGinley,	Inside engineer,	East Franklin,	Leg broken by striking against a shaft.
11	Patrick Moran,	Miner,	Otto,	Struck by piece of coal; hip hurt.
12	Evan Edwards,	do.	Eagle Hill Shaft,	Finger cut off, while getting on a wagon.
13	William Cannon,	do.	Palmer Vein,	Explosion of gas, while robbing pillars.
15	David W. Peregrine,	Driver,	Mine Hill Gap,	Kicked by a mule; hip hurt.
16	James Harron,	Loader,	Eagle Hill Shaft,	Caught between wagons; body injured.
18	George Williams,	Miner,	Glendower,	Struck by coal from shot; face and arm cut.
19	William Devine,	do.	Otto,	Fall of piece of coal: shoulder and breast injured.
23	Thomas Caufield,	Starter,	Mine Hill Gap,	Fall of piece of coal; back hurt.
23	George Jenkins,	Driver,	Richardson,	Spragging wagon; thumb caught between sprag and wagon and broken.
25	George Martin,	Miner,	do.	Explosion of gas; fired with naked light; burned severely.
25	Thomas Carroll,	do.	Eagle Hill Shaft,	Fall of coal; leg bruised.
27	W. H. Webb,	Coal pusher,	Wadesville,	Fell off the platform; arm broken in three places.
29	Henry Pugh,	Miner,	Glendower,	Fell off a wagon; leg injured.
Dec. 7	William Daley,	do.	Greenwood, No. 2, Lehigh, No. 10.	Explosion of gas; slightly burned.
11	Thomas McCalley,	Loader,	Wadesville,	Shoulder dislocated while loading a wagon.
14	Richard Toben,	Starter,	Richardson,	Premature discharge of dynamite; preparing a charge, his lamp ignited, the squib causing premature explosion; hands shattered and burned.
20	John Swank,	Miner,	Middle Lehigh,	Fall of coal in breast, starting coal at chute heading, a piece of coal from fall came down chute and struck him on the leg, breaking it.
22	Tim O'Herron,	Miner,	Eagle Hill Shaft,	Fall of some timber and loose coal and rock; back injured.

Recapitulation of Fatal Accidents in Pottsville District for 1880.

Explosion of gas,	4
Explosion of powder and blast,	1
Falls of coal, slate, &c.,	6
Mine cars,	2
Miscellaneous,	2
	15

Recapitulation of Non-Fatal Casualties in Pottsville District for 1880.

Explosions of gas,	13
Explosions of powder and blasts,	11
Falls of coal, slate, &c.,	59
Mine cars,	17
Miscellaneous,	29
	129

Comparative Statement of Casualties, Tonnage, and Employees for Six Years, in First or Pottsville Division of Mining District of Schuylkill.

YEARS.	Killed.	Injured.	Total.	Total number employees.	Number of employees to each casualty.	Total number tons coal mined.	Number of tons of coal mined to each fatal casualty.	Number tons of coal mined to each non-fatal casualty.	Ratio of tons of coal mined to casualties.	Number tons of coal to each employee.
1875 . . .	28	88	116	8,646	74½	2,853,629	101,915.06	32,427.12	24,600.05	330
1876 . . .	28	63	91	8,487	93⅓	2.317,056	82,752	27,917	25,462.03	273
1877 . .	29	111	140	5,847	41¾	1,580,780	54,510	15,151	11,291.05	270
1878 . . .	14	30	44	5,300	120½	1,229,081.03	87,791.10	40,969.07	27,933.13	232
1879 . . .	24	158	182	6,242	34⅓	1,855,164	77,298.10	11,741.11	10,193.04	297.04
1880 . . .	15	129	144	6,913	53½	1,461,070.17	97,404.14	11,326.02	10,146.06	211.07
Total,	138	579	717			11,296,781				
Average	23	96½	119½	6,906	69⅔	1,882,796.16	83,612	23,255.08	18,271.03	268.18

Report of Employees, Coal Mined, Days Worked, &c., for year ending December 31, 1880.

Collieries.	Operators.	Number miners.	Total employees.	Number kegs of powder used.	No. days worked by breaker.	Number persons killed.	Number persons injured.	Number tons of coal shipped.
Beechwood,	Philadelphia & Reading Coal and Iron Company,	106	232	670	157¾	. .	6	45,078.05
Colket,	do. do.	85	211	914	102¼	. .	3	25,481.08
East Franklin,	do. do.	76	185	400	171	.	3	34,418.18
Eagle Hill,	do. do.	85	239	505	170	2	13	56,427.16
Glendower,	do. do.	88	238	485	106½	. .	10	25,738.19
Mine Hill Gap,	do. do.	59	238	650	121¼	. .	7	35,028.18
Otto,	do. do.	75	202	620	99¼	.	4	35,639.09
Phœnix Park No. 2,	do. do.	64	149	390	149	1	4	23,468.11
Phœnix Park No. 3,	do. do.	72	166	585	117¾	. .	3	18,771.01
Pine Forrest,	do. do.	75	192	1,015	112	.	4	33,050.11
Pottsville,	do. do.	145	352	625	156	1	11	39,062.10
Richardson,	do. do.	109	303	945	165¼	2	5	70,773.14
Thomaston,	do. do.	168	376	1,495	171¼	1	8	77,186.03
Swatara,	do. do.	71	154	430	124	. .	3	21,463.18
Wadesville,	do. do.	234	467	1,560	195¾	3	23	106,388.00
Black Heath,	William H. Harris,	60	90	. . . .	. . . .	. .	2	26,883.09
Chandler,	Patrick Keenan,	. . . .	2	. . . .	. . .	. .	. .	426.05
Ellsworth,	John R. Davis,	12	38	. . .	260	. .	. . .	10,126.13
Eagle,	George W. Johns & Brother,	54	165	1,292	176¾	. .	. . .	41,466.14
Gettle & Wagner Tract,	W. & J. S. Heffner,	. . . .	5	. . .	. . . .	. .	. .	895.07
Gate Vein,	Gate Vein Coal Company,	9	30	12	37	1	. . .	398.17
Kalmia,	Phillips & Sheafer,	64	242	2,200	194	.	1	76,026.16
Lincoln,	Levi Miller & Co.,	136	400	4,400	197	1	2	125,170.08
Rausch Creek,	Miller, Graeff & Co.,	96	282	900	190	2	1	82,608.19
Lewis Tract,	Seth W. Geer,	. . . .	. . .	. .	. . . .	. .	. . .	773.07
Lehigh, No. 8,	Lehigh C. & N. Co.,	112	396	900	188	. .	4	96,145.12
Lehigh, No. 10,	do.	98	397	. . .	191¼	. .	7	91,509.01
Lehigh, No. 11,	do.	50	230	840	125¾	. .	3	40,806.05
Palmer Vein,	Alliance Coal Company,	54	138	502	165	. .	1	23,772.00
St. Clair,	Joseph Atkinson,	7	11	2	180	. .	. . .	2,253.13

Report of Employees, Coal Mined, Days Worked, &c., for year ending December 31, 1880—Continued.

COLLIERIES.	OPERATORS.	Number miners.	Total employees.	Number kegs of powder used.	No. days worked by breaker.	Number persons killed.	Number persons injured.	Number tons of coal shipped.
Sharpe Mountain,	Thomas Wren,	7	17	50	264			3,913.15
Wolfe Creek Diamond,	Thomas & Parnell,	21	69	100	98			5,060.11
Swatara,	John D. Felty,		2			1		719.00
Chandler Tract,	William Lloyd,		2					60 00
Monitor,	John H. Denning,		20					2,585.04
Peach Orchard,	do.		5					1,743.15
St. Clair,	Thomas Burke,	2	3					294.13
Tamaqua Tract,	A. A. Raabe.	1	3	14	240			1,306.06
Shaft No. 1,	Wood & Pearce,	10	64	300	140			14,357.10
Black Mine,	H. A. Moodie & Co.,	30	80	80	60			1,259.15
Tremont Lands,	Peter Lanx,		2					402.15
Whipporwill,	John Wylam,		2					239.00
	Theodore Helman,		2					323.00
	Edward Hoskins,	4	6					1,710.03
	James F. Donahoe,	4	9					5,005.01
Delaware Lands,	Small operators,		5					1,055.10
Russel Lands,	do.		29					3,670.04
Middle Lehigh,	M. W. Price, superintendent,	156	406	1,025	77		1	47,601.00
Hiawatha,	Sebastian Kestenbach,		3					150.00
	Stephens & Bossler,		3					150.00
Pine Dale,	Louis Lorenz,	20	34		100			3,000.00
East Lehigh,	Mitchell & Symonds,	5	17	164	171½			5,677.17
		2,530	6,913	23,970	* 151¾	15	129	1,367,531.06
Consumed or sold at collieries,								93,549.11
								1,461,070.17

* Average.

Names of Collieries in Operation in the Mining District of Schuylkill, Pottsville Division, during the year ending December 31, A. D. 1880.

Numbers and Names of the Collieries.	Location of Collieries.	Name of Operators.	Coal Produced.					
			1875.	1876.	1877.	1878.	1879.	1880.
Beechwood,	Mt. Laffee,	Philadelphia and Reading railroad,		65,402	103,192.00	80,911.02	73,057.17	45,078.05
Colket,	Donaldson,	do. do.		11,209	24,726.00	33,705.13	42,969.10	25,481.08
East Franklin,	Upper Rausch creek,	do. do.		30,096	48,367.02	3,025.02	34,297.01	34,418.18
Eagle Hill,	New Philadelphia,	do. do.		34,550	32,219.06	74,842.08	102,511.09	56,427.16
Glendower,	Glen Carbon,	do. do.		24,479	58,497.15	56,450.08	50,698.14	25,738.19
Mine Hill Gap,	Minersville,	do. do.		80,825	105,213.05	62,099.18	64,352.05	35,028.18
Otto,	Branchdale,	do. do.		27,756	89,989.09	71,540.18	63,830.06	35,639.09
Phœnix Park, No. 2,	Phœnix Park,	do. do.		25,956	31,769.06	2.00	13,612.00	23,468.11
Phœnix Park, No. 3,	Phœnix Park,	do. do.		22,557	22,427.09	11,018.07	19,305.18	18,771.01
Pine Forest,	St. Clair,	do. do.		37,519	53,073.06	44,564.08	84,268.01	33,050.11
Pottsville,	Pottsville,	do. do.		28,589	48,501.09	2,574.07	27,781.06	39,062.10
Richardson,	Glen Carbon,	do. do.		8,301	62,238.16	75,353.18	111,229.10	70,773.14
Thomaston,	Heckscherville,	do. do.		65,996	81,543.16	77,429.06	123,078.19	77,186.03
Swatara,	Swatara,	do. do.		17,562	22,247.14	20,026.18	22,420.05	21,463.18
Wadesville,	Wadesville,	do. do.		34,607	150,261.11	23,839.15	118,326.06	106,388.00
Black Heath,	Minersville,	William Harris,				22,152.10	24,910.11	26,883.09
Chandler,	Minersville,	Patrick Keenan,		115	56.05	164.05	316.00	426.05
Ellsworth,	New Castle,	John R. Davis,		9,595	5,856.08	13,536.18	16,229.15	10,126.13
Eagle,	St. Clair,	George W. Johns & Bro.,		43,389	50,065.05	27,862.00	49,087.19	41,466.14
Gettle & Wagner Tract,	New Castle,	W. & J. S. Heffner,			344.06	392.11	418.00	895.07
Gate Vein,	Pottsville,	Gate Vein Coal Company,				4,396.09	3,846.09	395.17
Kalmia,	Orwin,	Phillips & Shaeffer,		55,555	99,887.09	104,879.16	88,239.11	76,026.16
Lincoln,	Tremont township,	Levi Miller & Co.,		62,498	74,188.08	104,268.03	119,945.03	125,170.08
Rausch Creek,	Tremont township,	Miller, Graeff & Co.,		54,299	37,885.00	60,860.04	98,719.01	82,608.19
Lewis Tract,	Minersville,	Seth W. Geer,		230	127.10	189.00	430.03	773.07
Lehigh, No. 8,	Coal Dale,	Lehigh Coal and Navigation Co.,				87,078.00	118,866.03	96,145.12
Lehigh, No. 10,	Coal Dale,	Lehigh Coal and Navigation Co.,			196,871.07	101,542.00	127,950.15	91,509.01
Lehigh, No. 11,	Coal Dale,	Lehigh Coal and Navigation Co.,					71,566.13	40,806.05
Palmer Vein,	New Philadelphia,	Alliance Coal Company,		11,447	17,240.00	27,361.00	17,066.00	23,772.00
St. Clair,	St. Clair,	Joseph Atkinson,		1,998	491.11	965.17	2,774.17	2,253.13
Sharpe Mountain,	Pottsville,	Thomas Wren,				1,930.00	3,657.05	3,913.15
Wolf Creek Diamond,	Minersville,	Thomas & Parnell,				17,071.03	19,455.19	5,080.11
Swatara,	Swatara,	John D. Felty,		541	609.15	305.04	382.15	719.00
Chandler Tract,	Minersville,	William Lloyd,		145		22.00	93.00	60.00
Monitor,	Wadesville,	John H. Denning,		3,394				2,585.04
Peach Orchard,	St. Clair,	John H. Denning,					675.05	1,743.15
St. Clair,	St. Clair,	Thomas Burke,						294.13
Tamaqua Tract,	Tamaqua,	A. A. Raabe,		82	67.18			1,306.06
Shaft No. 1,	Tamaqua,	Wood & Pearce,				4,435.05	16,734.10	14,357.10
Black Mine,	Llewellyn,	H. A. Moodie & Co.,						1,259.15
Tremont Lands,	Tremont Lands,	Peter Laux,		291	1,549.07	917.10	848.10	402.15
Whipporwill,		John Wylam,						239.00
		Theodore Helman,						323.00

Names of Collieries in Operation in the Mining District of Schuylkill, Pottsville Division, during the year ending December 31, 1880—Continued.

NUMBERS AND NAMES OF THE COLLIERIES.	Location of Collieries.	Name of Operators.	COAL PRODUCED.					
			1875.	1876.	1877.	1878.	1879.	1880.
		Edward Hoskins,						1,710.03
		James F. Donahoe,						5,005.01
Delaware Lands,		Small operators,						1,055.10
White Oak,	New Castle,	John H. Denning,		7,542	5,952.19	751.03	2,879.01	
Chandler Tract,	Minersville,	Edward McGovern,		353		59.10	19.10	
Middle Lehigh,	Mahanoy City,						28,990.05	47,601.60
Lorberry,	Lorberry,	S. Faust & Son,					648.01	
Peach Mountain,	Pottsville,	George Wilson,					502.00	
York Farm,	Pottsville,	Job Rich,					975.00	
Hiawatha,	Middleport,	S. Kestenback,					925.00	150.00
Crystal,	New Castle,	Joseph Brady,					1,158.00	
Middleport,	Middleport,	Louis Lorenz,					1,525.04	3,000.00
Palmer, No. 1,	New Philadelphia,	John Harron,					273.18	
Coal Hill,	New Castle,	R. Hollahan,					458.10	
Tuscarora,	Tuscarora,	J. Kershner,					229.10	
Brookville,	Brockville,	B. F. Palmer,					577.00	
Kaska William,							602.00	
Peach Orchard,	New Castle,	George Morgan & Co.,					950.00	
Mammoth,	Minersville,	Quin & Mahoney,					338.15	
W. C. Big Diamond,	Minersville,	James F. Donahoe,					783.00	
Small Operators,				385,378	74,635.01	2,881.10		
Forestville,	Minersville,	Philadelphia and Reading railroad,		22,367	49,317.13	5,312.03		
Middle Creek Shaft,	Middleport,	Philadelphia and Reading railroad,		25,432	31,361.15	4,697.00		
Russel Lands,		Small operators,						3,670.01
East Lehigh,	Mahanoy City,	Mitchell & Symunds,						5,677.17
		Stephens & Bossler,						150.00
Total,			2,853,629	2,317,056	1,580,780.00	1,229,081.03	1,773,612.08	1,367,531.06
Sold or consumed at collieries,							81,551.12	93,549.11
Gross total produced,							1,855,164.00	1,461,070.17

SECOND DISTRICT.

Office of Inspector of Mines,
Shenandoah, Pa., *March 7, 1881.*

To His Excellency Henry M. Hoyt,
Governor of Pennsylvania:

Sir: In compliance with the requirement of section twenty-two of the "Ventilation Act," approved March 3, 1870, I have the honor to submit the following report:

My predecessor, Samuel Gay, having been assigned to the First, or Pottsville district, I assumed charge of this office on September 22, 1880.

That the report may be more convenient and uniform, the accompanying tables and data contain all the accidents, tonnage, improvements, &c., for the year 1880, covering the period of Mr. Gay's occupancy of this office, as well as my own. At the time I assumed charge of this district efforts were being made to extinguish the Kehley Run mine fire and are still in progress. As no result has been reached, I only note a few incidents that have fallen under my notice, in connection or additional to the very full and detailed account given by Mr. Gay in this report, in regard to it.

There were thirty-nine persons fatally injured, as against forty-three in 1879, a decrease of four for year. Ninety-two were injured, many of a slight character, as against one hundred and eleven for preceding year, being a decrease of nineteen.

Through courtesy of secretary and geologist of board of commissioners of State, I am enabled to attach to this report a contour map showing the Mahanoy and Shenandoah basin.

Total amount of coal shipped to market,	3,543,663.04
Consumed or sold at colliery,	210,122.10
Total output for year,	3,753,785.14
Total output for 1879,	4,386,969.00
Decrease of tonnage for 1880,	633,183 06
Total number of employés,	11,471.00
Production of coal to each employé,	327.04
Ratio of life lost to total production,	96,250.18

Ratio of persons injured to total production, ...	40,802.00
Ratio of life lost to total employés, ...	294.12
Ratio of persons injured to total employés, ...	124.68

Very respectfully, &c.,
ROBERT MAUCHLINE,
Inspector.

IMPROVEMENTS.

Colorado.

Engine-house erected to replace that burned down on 28th October; drove about fifteen hundred feet of gangway and same length of air-way.

Shenandoah.

Erected pair of direct hoisting engines to work deep slope, fourth lift; opened four gangways on the top and bottom split of mammoth veins from fourth to second lift.

Lehigh, No 3.

A new hoisting slope sunk to fourth lift; erected a single hoisting engine to hoist from fifth, sixth and seventh lifts to fourth lift; also a large fan and engine. Sunk a new air way to fifth lift, and opened gangways on third, fourth, fifth and sixth lifts, extending same 4,813 feet.

Packer, No. 4.

Erected one pair geared hoisting engines; inside slope sunk to basin, 788 feet; tunnel driven from mammoth to the Holmes and Primrose veins, 328 feet; tunnel driven towards Buck mountain vein 50 feet; drove 2,500 yards gangway, 2,500 yards air-way heading, and upwards of 1,000 feet main air-way.

Cambridge.

One large dump chute built at breaker.

Coplay.

Erected fan, with necessary machinery, 15 feet diameter.

Kohinoor.

Erected two new boilers 28 feet long, 40 inches diameter, outside; two large boilers erected inside to serve as air receivers; slope No. 2 sunk to basin 180 yards.

Stanton.

Tunnel driven from mammoth to Buck mountain vein, 60 yards.

Staffordshire.

Drove tunnel 130 yards.

Webster.

Erected two screens, one set of elevators, one set of new monkey crushers in breaker.

Suffolk.

Erected four new boilers 30 feet long, 34 inches diameter.

Cuyler.

Opened new level.

Oakdale.

This colliery was formerly named Roanoke. Erected eight-horse power engine to run rolls and screens in breaker, and to hoist coal from drift to breaker. Machinery and hoisting were run by mules working gin.

Primrose.

Tunnel drove south from lower split of mammoth to Skidmore vein, and tunnel drove north from middle split of mammoth to top split of same vein.

Bear Ridge, No. 1.

West gangway on south dip, abandoned four years ago, has been reopened, and eight breasts opened to fair to good coal ; drove counter gangway on north dip one hundred yards, with room to open four breasts ; drove an exhaust hole 97 yards.

Bear Ridge, No. 2.

Erected outside plane, engine and boiler-houses, and two new dwelling houses ; built 11 new cars ; drove east side center chute 97 yards ; gangway driven 200 yards, with room for 10 breasts ; muleway driven to surface ; drove counter chute west side 105 yards, with gangway 200 yards, and room for 10 breasts.

Suffocated by Gases.

Two accidents under above head occurred during year by which four valuable lives were lost ; both accidents at Kehley Run colliery.

The first occurred on the night of July 26–27, when Jonathan Wasley, superintendent, and Frank Willman, inside boss of this colliery, with John Reese, district superintendent of the Philadelphia and Reading Coal and Iron collieries, in Shenandoah basin, were the victims.

Owing to the prominent positions occupied by the deceased, both Mr. Wasley and Mr. Reese being gentlemen who had always taken an active part in all that related to benefiting the people among whom they lived, and now stricken down in the prime of their life and usefulness, under such mysterious circumstances, caused widespread excitement not only in Shenandoah, the scene of the accident, but throughout the Schuylkill region. On the night above stated, between ten and eleven o'clock, they entered the old water level gangway workings, which had been abandoned for upwards of fourteen years ; why they did so, or what their object was in entering these workings at such a time has never been positively ascertained, as they had not imparted any information to any person of their contemplated movements or designs ; they had said to their wives they were going to the mine and would be back in about an hour.

Their purpose, therefore, has ever been a matter of conjecture, yet with the facts and incidents that occurred prior to accident or were developed afterwards the following hypothesis would appear to be correct.

A tunnel, marked on sketch, had been driven from the Buck mountain to the mammoth vein ; at the north end of the tunnel, or Buck mountain vein end, there had been an old breast driven out to the surface; in the tunnel ninety-four feet from mammoth vein a battery, marked "G," had been built.

On the night of the accident and prior to the entry of these men, the evidence tends strongly to prove that the battery door was closed, that they entered the old gangway, thence to this battery in tunnel with the purpose of opening it, that in doing so the gas that was causing the trouble, and which was escaping through the old gangway into the new slope, would then escape through the north end of the tunnel to the surface, it being the most elevated point.

Two mine locomotives used in the old slope workings, but which some time prior to accident, owing to complaints of the air current being fouled by the gas generated by them, the superintendent, upon my positive demand for their removal, agreed that they should be kept out of the part of the mine complained of and mules employed in their stead.

With this change no further difficulty was experienced until about the 14th of July, when my attention was again called to the condition of the air, this time, however, in the new slope workings.

In the examination of the air currents and workings, I found the ventilating current passing in the intake sufficiently strong for all purposes, had it been pure air. Upon interrogating the workmen, those working at bottom of slope stated that the air appeared to be good and in sufficient quantity, that their lights burnt as brilliant as though they were outside on surface ; about same statements were made by the miners in the gangway and breasts, except that they added that there was an odor readily detected and which they attributed to the locomotives in use in the old slope, the west gangway of which crossed the new slope at right angles and bratticed from connection with it, with one inch boards, a door having been placed for passage of persons from gangway into slope or vice versa. The bratticing, however, was of a temporary character and through which the vitiated air, produced by the locomotives, could readily escape into the new slope, which was the intake or downcast.

At this time there was not the remotest idea entertained by any person of the existence of fire in the mine, other than that in the locomotive furnaces, and all agreed in their opinions that the fouling of the air was directly attributable to them, this view being sustained by openings, cracks, &c., through which the gas from the old workings could escape into the intake or new slope.

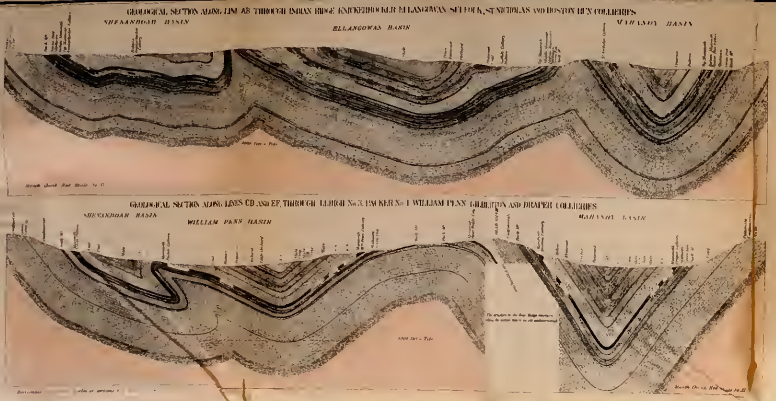
That this view or opinion was held also by the superintendent, is substantiated by the last letter written by him to the president of the mine company on the evening of the night he entered the mine, in which he stated that the trouble they were having was caused by gases generated by the locomotive fires, although on examination of the mine on the 13th instant, he did not admit to me that such was his belief, but rather held that my opinions were to be attributed to prejudice against the use of locomotives in the mines.

SECOND GEOLOGICAL SURVEY OF PENNSYLVANIA
J P LESLEY STATE GEOLOGIST

MAP
OF PART OF THE
MAHANOY AND SHENANDOAH BASINS
IN THE
SECOND ANTHRACITE COAL FIELD

SHOWING THE
SHAPE OF THE FLOOR OF THE MAMMOTH BED
BY CONTOUR LINES 50 FEET APART
AND THE
AREAS OF EXPLOITATION OF ALL THE BEDS NOW MINED
WITH THEIR SLOPES SHAFTS, TUNNELS AND GANGWAYS
CONSTRUCTED FROM DATA FURNISHED BY
THE OPERATING COMPANIES

CHAS A. ASHBURNER ASST GEOLOGIST
A.W SHEAFER AID
1881

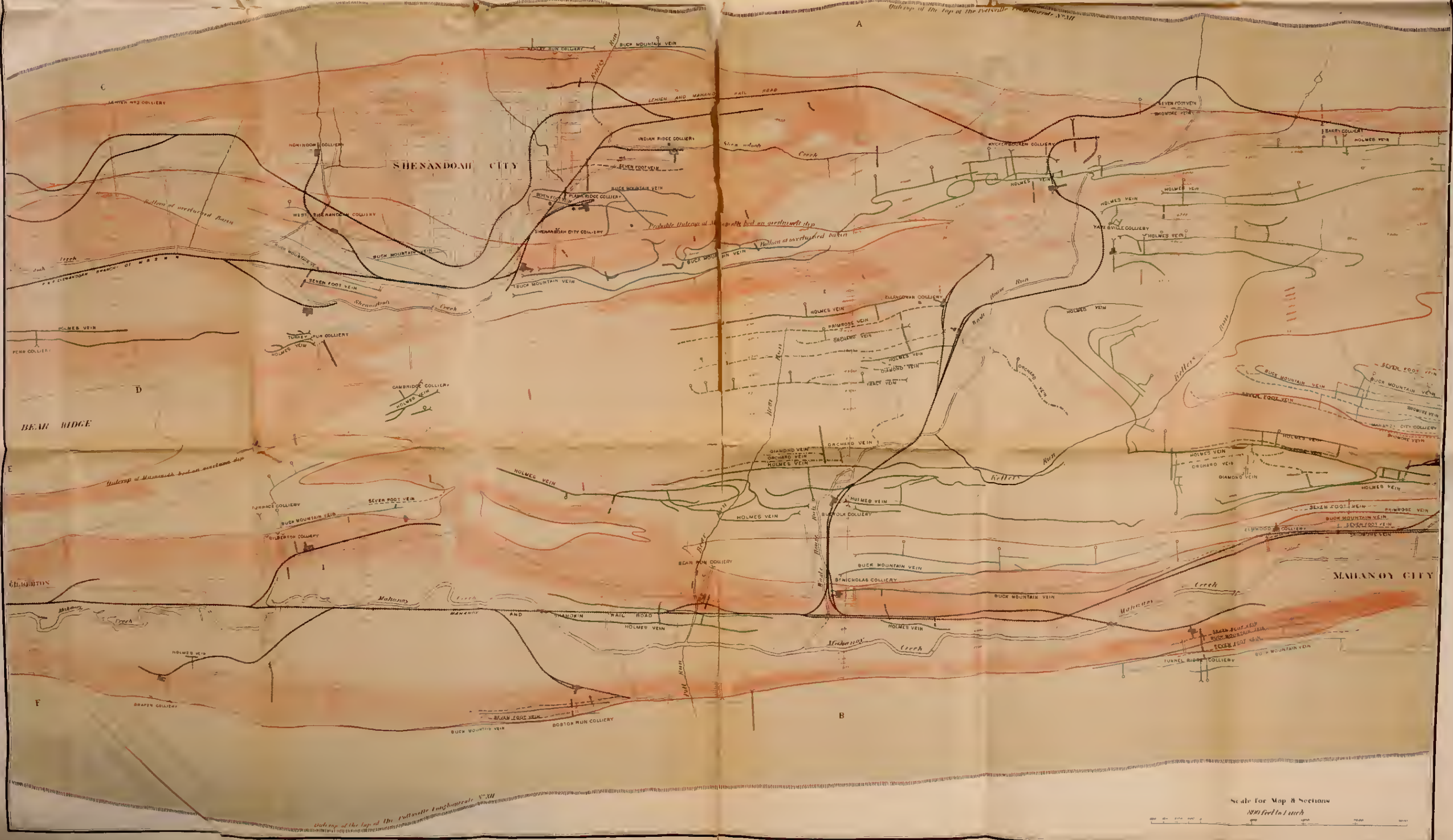

GEOLOGICAL SECTION ALONG LINE AB THROUGH INDIAN RIDGE KNICKERBOCKER ELLANGOWAN SUFFOLK, ST NICHOLAS AND BOSTON RUN COLLIERIES
SHENANDOAH BASIN
ELLANGOWAN BASIN
MAHANOY BASIN
GEOLOGICAL SECTION ALONG LINES CD AND EF THROUGH LEHIGH No 3, PACKER No 4 WILLIAM PENN GILBERTON AND DRAPER COLLIERIES
SHENANDOAH BASIN
WILLIAM PENN BASIN
MAHANOY BASIN

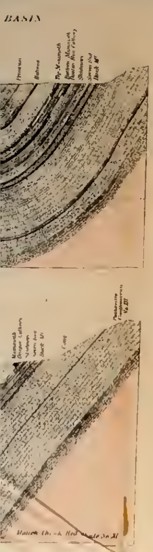
NOTES

1 The Map [illegible]

2 All material [illegible] Mammoth coal bed [illegible]

[illegible] worked out and under development [illegible] July 1st 1880





SECOND GEOLOGICAL SURVEY OF PENNSYLVANIA
J. P. LESLEY, STATE GEOLOGIST

MAP
OF PART OF THE
MAHANOY AND SHENANDOAH BASINS
IN THE
SECOND ANTHRACITE COAL FIELD
SHOWING THE
SHAPE OF THE FLOOR OF THE MAMMOTH BED
BY CONTOUR LINES 50 FEET APART
AND THE
AREAS OF EXPLOITATION OF ALL THE BEDS NOW MINED
WITH THEIR SLOPES SHAFTS, TUNNELS AND GANGWAYS.

CONSTRUCTED FROM DATA FURNISHED BY
THE OPERATING COMPANIES.

CHAS A ASHBURNER, ASST GEOLOGIST
A W SHEAFER, AID
1881

NOTES

1. The Map was constructed to a scale of 800 feet to 1 inch by Chas. A. Ashburner, A.W. Sheafer and Isaac Morris directly on the working Maps of the mines furnished by the Philadelphia and Reading Coal and Iron Co. the Lawrence Estate and the Gilbert Estate; this Map was afterwards reduced by photography to the scale of the present map 1600 = 1 in.

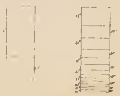
2. All material printed in red refers directly to the Mammoth coal bed, the outcrop of the bed being indicated in a hazy line and the 50 feet contours on the bed by light lines.
With the exception of the tunnels the black printing relates to the geographical features exclusively.
The slopes, air ways, adits and gangways driven in coal beds overlying the Mammoth bed are represented in green and the same in beds underlying the Mammoth in blue.

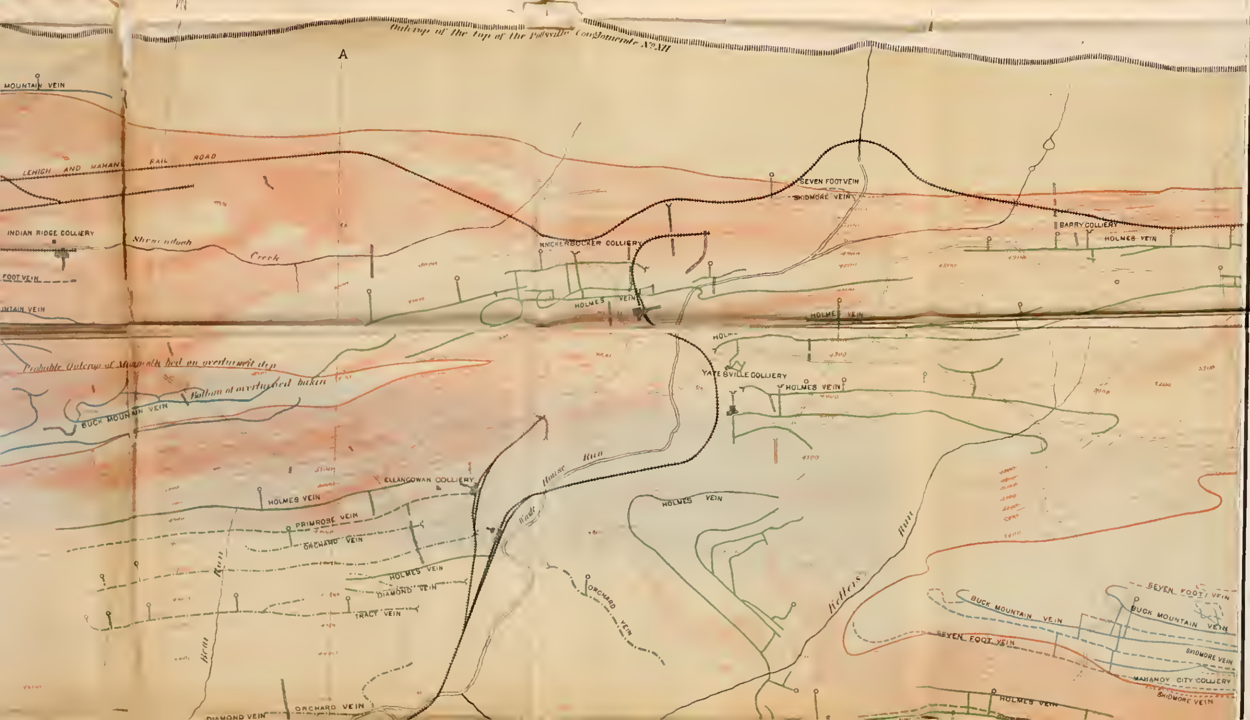
▨ *Area of the top bench of the Mammoth coal bed worked out and under development*
▨ *bottom*

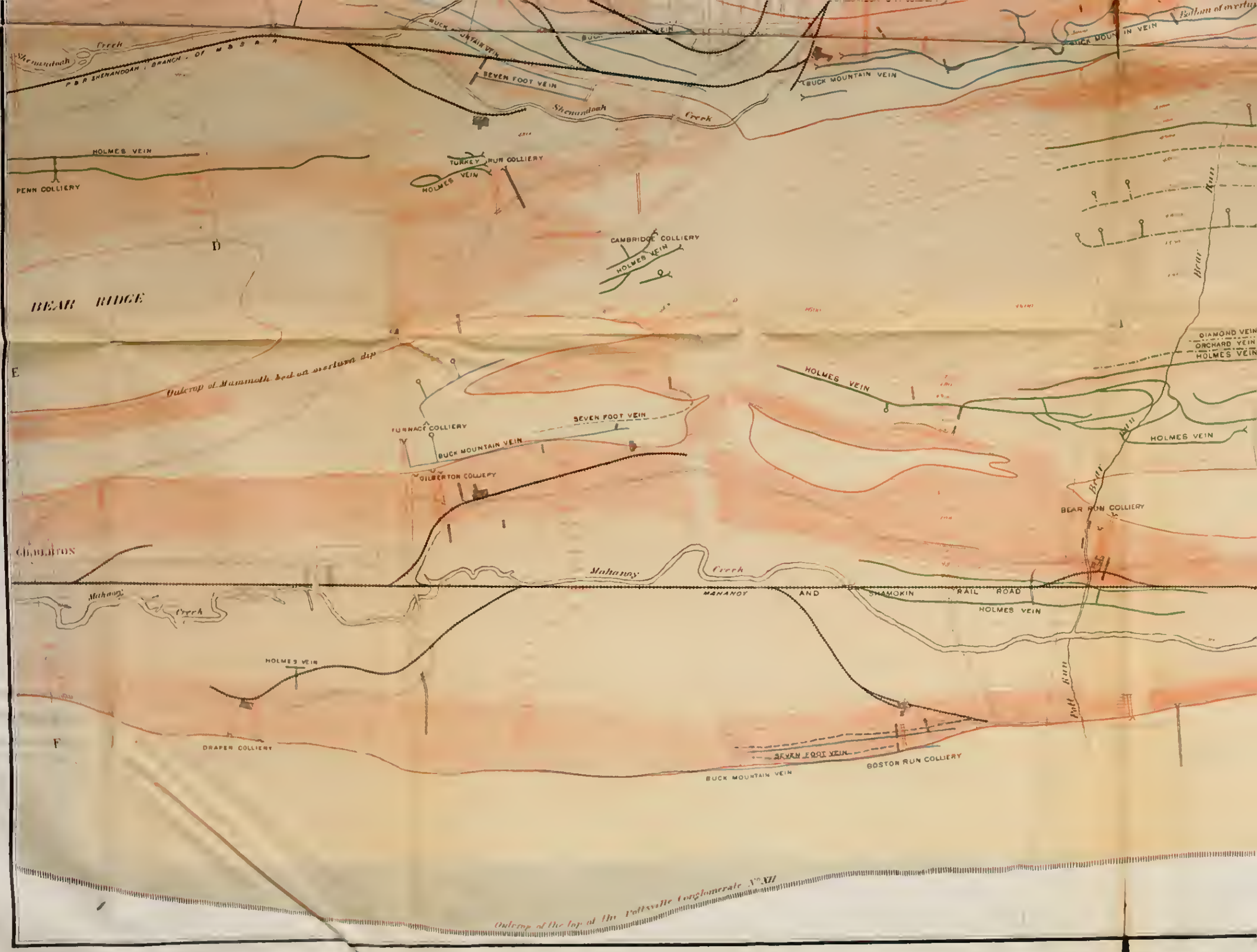
—·—·—	*Tracy Bed*	......	*Skidmore Bed*	▭	*Shafts*
—··—··—	*Diamond Bed*	— — —	*Seven-Foot Bed*		*Slopes*
—·—·—	*Orchard Bed*	———	*Buck Mtn. Bed*		*Tunnels*
— — —	*Primrose Bed*				*Air holes*
———	*Holmes Bed*				*Adits*
					Coal Breakers and R.R. Stations

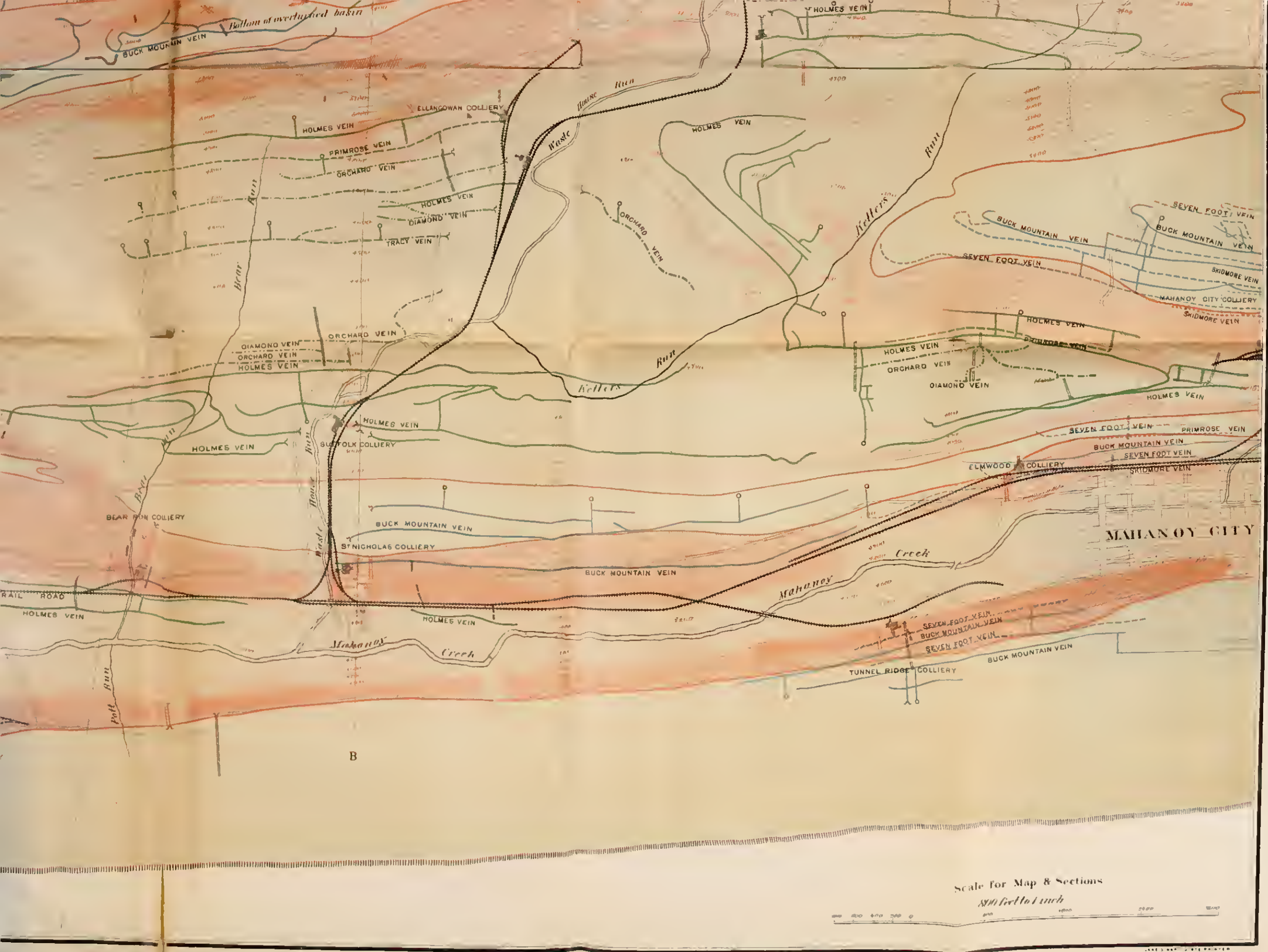
The area worked out and under development of the coal beds underlying and overlying the Mammoth may be ascertained by circumscribing the top of the air-ways and slopes and the lowest gangways driven in each bed.
Datum of Elevations 1000 feet below tide.
The mining data is brought up to July 1st 1880.

Distance between Contour Curves corresponding to the Dip of the Mammoth Coal Bed in degrees






Shenandoah Creek
P & R Shenandoah Branch of M & S R R
Buck Mountain Vein
Seven Foot Vein
Shenandoah Creek
Buck Mountain Vein
Bottom of overturn
Holmes Vein
Penn Colliery
Turkey Run Colliery
Holmes Vein
Cambridge Colliery
Holmes Vein
D
Bear Ridge
Bear Run
E
Outcrop of Mammoth bed at overturn dip
Diamond Vein
Orchard Vein
Holmes Vein
Holmes Vein
Furnace Colliery
Seven Foot Vein
Buck Mountain Vein
Gilberton Colliery
Holmes Vein
Bear Run
Bear Run Colliery
Gilberton
Mahanoy Creek
Mahanoy Creek
Mahanoy and Shamokin Rail Road
Holmes Vein
Holmes Vein
Potts Run
F
Draper Colliery
Seven Foot Vein
Buck Mountain Vein
Boston Run Colliery
Outcrop of the top of the Pottsville Conglomerate No XII


Bottom of overturned basin
BUCK MOUNTAIN VEIN
HOLMES VEIN
Waste House Run
ELLANGOWAN COLLIERY
HOLMES VEIN
PRIMROSE VEIN
ORCHARD VEIN
HOLMES VEIN
DIAMOND VEIN
TRACY VEIN
Bear Run
ORCHARD VEIN
Kellers Run
SEVEN FOOT VEIN
BUCK MOUNTAIN VEIN
BUCK MOUNTAIN VEIN
SEVEN FOOT VEIN
SKIDMORE VEIN
MAHANOY CITY COLLIERY
SKIDMORE VEIN
HOLMES VEIN
PRIMROSE VEIN
ORCHARD VEIN
DIAMOND VEIN
ORCHARD VEIN
DIAMOND VEIN
ORCHARD VEIN
HOLMES VEIN
HOLMES VEIN
Kellers Run
HOLMES VEIN
HOLMES VEIN
SUFFOLK COLLIERY
SEVEN FOOT VEIN
PRIMROSE VEIN
BUCK MOUNTAIN VEIN
SEVEN FOOT VEIN
ELMWOOD COLLIERY
SKIDMORE VEIN
BEAR RUN COLLIERY
BUCK MOUNTAIN VEIN
MAHANOY CITY
St NICHOLAS COLLIERY
Mahanoy Creek
BUCK MOUNTAIN VEIN
RAIL ROAD
HOLMES VEIN
HOLMES VEIN
SEVEN FOOT VEIN
BUCK MOUNTAIN VEIN
SEVEN FOOT VEIN
Mahanoy Creek
BUCK MOUNTAIN VEIN
TUNNEL RIDGE COLLIERY
Pott Run
B
Scale for Map & Sections
800 feet to 1 inch
800
600
400
200
0
800
1600
2400
3200

On completion of examination of mine, the changing of the ventilation fan from an exhaust to a forcing power was urged, thus making the new slope an upcast instead of a downcast, as it then was, so that gas escaping into it from old slope workings would be carried direct to the surface. This advice was not accepted, but preference given to a temporary plan of converting Kohinoor colliery workings, that had been holed through to Kehley run workings, near face of west gangway, into an intake, closing the new slope current by a door about seventy-five yards west of the slope.

This did not accomplish the desired result, as on the 26th the men working at the bottom of the slope became sick from the effects of the gas, and were compelled to quit work at about noon in consequence thereof; upon learning which facts I visited Mr. Willman, inside boss, at his home, to make further inquiries, as also to notify him and Mr. Wasley that if any further attempts were made to work the new slope until satisfactory ventilation was permanently secured, a petition to court for an injunction to restrain them would be immediately presented, notifying Mr. Willman, at the same time that I would be at the mine in the morning to protest against the workmen going down the slope. The following morning, while engaged in preparing to go to the mine, a messenger from Mrs. Reese came to my house to make inquiries in respect to her husband, stating that Messrs. Wasley and Willman had come for him about ten o'clock to go with them to the mines, and that he had been absent all night, having sent assurances by the messenger that Mr. Reese was all right, as he knew all about the dangers to be encountered.

I immediately started for the colliery. On the previous evening, after leaving Willman, I had met Reese and conversed with him in regard to the condition of this colliery, the dangerous character of the gas, and my determination to stop its working until satisfactory improvement was made in ventilation, as some of the workmen might be overcome by it, and if not suffocated, would possibly fall under passing cars and be seriously injured or killed; that the responsibility of loss of life or injury should not rest upon me, if possible to avoid it; therefore, I had perfect confidence that the assurances sent Mrs. Reese were true, never for a moment believing that the three persons with whom I had frequently discussed the deadly and treacherous character and effects of carbonic oxide gas, or as known to miners, "white damp," would be its victims.

Arriving at the head of the slope, I met the night watchman, of whom I made inquiries. He stated that they had not gone down into the mine, but that they had come there about eleven o'clock, and having provided themselves with lamps, went west towards the stable; that they had not said to him where they were going, nor anything in respect to what they intended to do. At this time a miner who, in coming to work, had passed along the line of crop falls, west of the stable, stated that he had seen footprints in one of the old cave holes, as though some persons had gone into it. Proceeding to the place designated, (marked on sketch, crop fall opposite breast 15,) accompanied by several workmen who had arrived at the colliery to go to work, an examination of the foot-prints was made which convinced me that these men had gone into the old workings through this breach. As soon as this fact was made known, the men present were anxious to rush down the opening, every man a hero, as all knew it was at the most imminent risk of life to enter these workings. Having arranged with six to follow me down in "Indian file," with a distance of about twenty-five feet between each, so that should I become overcome with the gas they could render assistance in relieving or come to my rescue.

Proceeding thus through the breach and down into gangway about one hundred and forty feet from entrance, experiencing no difficulty in carrying light, at this point the effects of the gas were felt. Telling those following me to fall back, turning to retrace my steps, I fell and was removed by my brave companions in an unconscious state to the surface, where restoratives were applied which restored consciousness, but left me very weak and debilitated.

Intelligence of the disaster had by this time rapidly spread not only through Shenandoah, but throughout the county; the population of the town turned out almost *en masse*. Superintendents, bosses, and workmen from all the neighboring collieries flocked to the scene of the accident and rendered all the assistance they could to aid in the recovery of the bodies of the three men, as all hope of saving life had been dispelled when I was stricken down. Although gang after gang of men went in and in a short time would either return unsuccessful and sick, or were brought out unconscious, yet the main difficulty experienced was to keep too many from entering the deadly gangway, as the medical fraternity, early upon the scene and deserving of all praise, were constantly pressed in their noble work of resuscitating the large number who were being brought back to the surface overcome by the gas.

Impressing upon the most competent of those present the impracticability of exploring the workings unless ventilation was established, and being too ill to take any part, Col. Brown, superintendent Philadelphia Coal Company's collieries, William Hemingray, ex-mine inspector, Edward Reese, P. & R. C. & I. Co. superintendent, and brother of John Reese, assumed charge, with many others to assist them. After great labor, amid much excitement, they succeeded in clearing the gangway of gas sufficiently to admit, shortly before one o'clock, a party headed by William Hemingray and Col. Brown, to enter it, finding the bodies of the three men cold in death.

The positions in which the bodies were found strengthens the theory that they were unaware of their great danger until precaution was useless, as Reese was found with his face pressed tightly against a soft felt hat that he had worn; near his face lay a cigar partly smoked. Willman had evidently been smoking also, as his pipe was picked up within a few inches of his face. He seemed to have made an effort to crawl forward on his hands and knees, when effects of gas were felt. Wasley appeared to have fallen heavily on his face and never to have moved, being instantly overcome by its deadly effects.

As marked on sketch, the bodies were found one hundred and forty-eight feet from point of entrance and two hundred and six feet from battery in tunnel, facing entrance, conclusively proving that they were on their return from battery.

The second accident under this head occurred in the same colliery as the preceding one, on September 1st, by which Simon Gregory, assistant inside boss, lost his life, although the circumstances through which it occurred, and location, were quite different. This accident took place in the old slope, west gangway, at about the foot of the traveling way, and was the result of an explosion of gas, (carbonic oxide,) blowing out stoppings that had been but a short time prior erected for the purpose of confining the gases given off by mine fire and to cut off all the avenues whereby the fire might receive a supply of air to support combustion. As under the head of "Kehley Run Mine Fire," a detailed account is given of this explosion and the causes that led to the ignition of the pent up gases, it would be but repeating what is there written, and it will suffice to add that the old workings and traveling way were charged with gases given off by the burning material, that having become reduced in temperature below that of the surface, when the stopping that had retained or held in check in the old workings were destroyed, it escaped into the gangway in large volumes.

This, in connection with the after damp produced by the explosion, vitiated the air column to such an extent as to be highly destructive to life; fortunately the ventilating fan was connected direct to the small section of the openings, a volume of air not less than 15,000 feet per minute sweeping through the gangway at the time of the accident, or the result would have been much more serious, as there were five other persons situated in quite as dangerous places as that occupied by the deceased, in fact three persons much more so, as they were two hundred feet further away from a supply of pure air.

Two of the number, before they could reach a place of safety from the effects of the gases, fell; but in this, as in nearly all cases of accident occurring in the mine, no matter what its character, brave men were at the slope bottom, who, regardless of the peril to their own lives, went quickly forward to save the lives of their fellow workmen, which they successfully accomplished, with the exception of that of Simon Gregory, who, for several hours could not be found. When discovered, his body was lying in crosscut, marked on sketch, between the main gangway and slope in the water course, face downwards, and completely covered by the water. In the position in which found, if the poisonous gases had not fully destroyed life, the water would have completed the destruction of whatever vitality remained.

Explosions of Carbureted ^{2}H. Gas.

This district has been extremely fortunate in being comparatively exempt from accidents of this character, only one having occurred involving the loss of one life.

We feel that it is necessary to call special attention to this class of accidents arising from explosions of gas or steam boilers, as involving greater danger and loss of life than that of any other class of accidents; and which, with proper ventilation and due precaution, would, in many cases, be prevented.

On morning of September 16, at Kohinoor colliery, five persons were burned by explosion of gas. Among this number the fire boss and inside boss; three seriously; two of the latter recovered; the third, aged sixty years, after lingering several days, died.

In my examination into the causes of this occurrence, I could get none of those present at the time to acknowledge having ignited the gas.

The fire boss testified that he made an examination of the working places upon that morning and found them clear of gas. He also stated that he ran a mine car, partly loaded, down and out of the breast worked by the deceased, assigning as his reason for doing so that the top and pillars were on the move, or crushing; that he believed it would close and that the car would be destroyed if left in breast, and therefore removed it to gangway as being the safest place.

The colliery officials advanced the theory that there had been an outburst of gas, owing to crush. While it is true that outbursts of gas may and possibly do occur in this region, yet it is hardly probable in this colliery, and I am more than ever convinced that outbursts of gas are charged with causing explosions, when the producing causes should rest elsewhere.

From the evidence and examination made in this case, notwithstanding foregoing statements, it appeared evident that there was an accumulation of gas in the breast of deceased when the fire boss made his morning rounds, but that in consequence of the thickness or height of coal taken down, and the dangerous condition of the place caused by the threatening crush, he failed to make his examination as carefully as he had usually done, and that when the deceased had gone into the breast to fetch out his tools he ignited the gas therein. As he was in the breast when the explosion took place, and all the other workmen were either out on gangway or in close proximity to it.

Kehley Run Mine Fire.

This colliery is situated, partly in the borough of Shenandoah and partly in West Mahanoy township, Schuylkill county, upon the lands of the Girard estate, on the south dip of the mammoth vein, in the northern Shenandoah basin. It was opened in the year 1865, and has been a successful colliery, having shipped up to 1st of January, 1880, one million forty-seven thousand one hundred and fifty-three tons (1,047,153) of coal, and during this period has been more than ordinarily exempt from serious accidents.

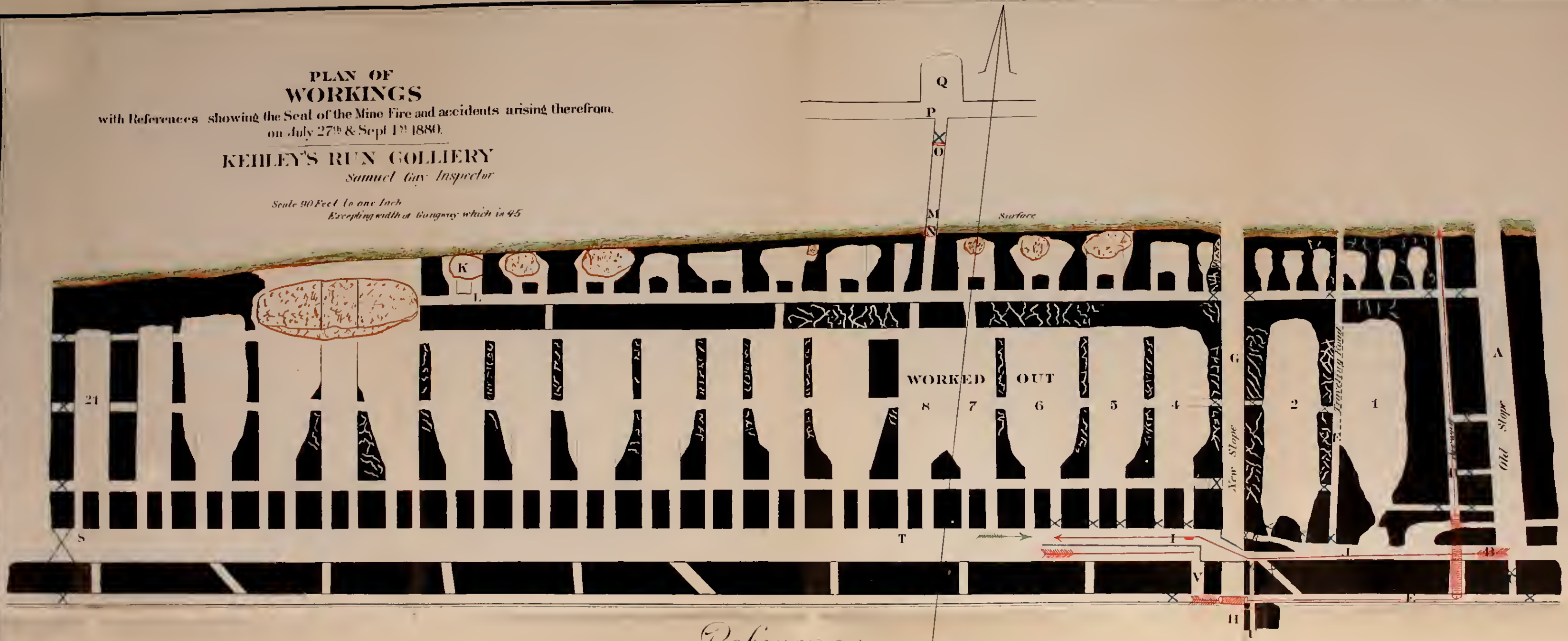
The openings consist of two slopes, No. 1 or old slope is sunk about one hundred and thirty yards on an average dip of about 38°, the new or west slope is sunk about two hundred and ten yards from the surface, or one hundred and eighty yards below water-level.

The west gangway on the old or No. 1 slope level where the fire was dis-

PLAN OF
WORKINGS
with References showing the Seat of the Mine Fire and accidents arising therefrom, on July 27th & Sept 1st 1880.

KEHLEY'S RUN COLLIERY
Samuel Gay Inspector

Scale 90 Feet to one Inch
Excepting width of Gangway which is 45



Reference

A	*Old Slope*
B	*Gangway on first lift*
C	*Cross cut from bottom Slate Gangway to top*
D	*Air Shaft connecting with ventilating fan*
E	*Top Slate Gangway*
F	*Traveling way*
G	*New Slope from first level to Surface*
H	*New Slope Second lift*
I	*Where first Battery was erected to Confine the fire*
J	*Log Battery*
K	*Crop fall where Wesley Reese & Willman entered the old waterlevel workings*

L	*Waterlevel Gangway*
M	*Waterlevel Tunnel*
N	*Air Shaft about No. 8 Breast where first Explosion occurred*
O	*Battery in tunnel supposed to be opened by on the night of the accident*
P	*Buckmountain Gangway*
Q	*Opening out to the Surface*
R	*Place where Gregory was found*
S	*West Battery erected to confine the fire*
T	*Place where the fire was first discovered*
U	*Airway*
V	*Return Airway*

←	*Showing Air currents*
→	*Indicating the currents of Gases mingling with the Air currents obstructing the Workmen in building Brattice which difficulty would have been avoided had the action of the Fan been Positive instead of Negative*
×	*Stoppings*
—	*Brattice*
▬	*Air crossings*
○	*Crop falls*
▮	*Pillars partially taken out balance remaining crushed*

covered and still exists, had been driven to the boundary line, although there yet remained a large amount of coal to be won from pillars, as also from the top member of the vein, which had not been worked so extensively as the bottom.

This fire had without doubt been burning for some considerable time prior to its discovery and the loss of three valuable lives which occurred on the 27th of July, 1880, the result of the gases arising therefrom by suffocation, a detailed account of their death is given under head of fatal accidents in this report.

It may be pertinently asked whether there were not indications of the existence of fire prior to its discovery, in answer to which query I would state that for some two or three weeks previous to the suffocation of the three persons spoken of above, the peculiar odor of gas given off by the combustion of coal had been detected, but was explained or accounted for by the fact of there being two mine locomotives employed in the colliery for the haulage of coal. Anthracite coal, the product of the mine, was used for the fire in the locomotives, and the gases given off by these fires was necessarily the same as that given off by the combustion of the same material elsewhere in the connected workings of this mine. Hence the colliery officials and others were justified in their firm belief that the gases that were causing the trouble in the new slope for the two or three weeks prior to the discovery of fire were to be attributed to those generated by the locomotive furnace fires, and therefore could not have had any reasonable cause to suppose that it emanated from a mine fire. That this was the opinion held by the superintendent (J. Wasley) is confirmed by the last letter written by him on the evening of the night he lost his life to the president of the company he represented, in which letter he stated "On the 27th the new slope had worked but half a day in consequence of gas given off by the mine locomotives getting into the old water level gangway, passing from thence into the new slope (which was the intake) and then to the part of the workings where men were employed," completing his letter with the assurance that "the difficulty would be removed and everything right for work on the following morning."

The cause or causes through which this disastrous fire originated are unknown, and is a mystery that will probably ever remain unsolved.

The mine did not generate explosive gases, nor had there been any furnace near where the fire was discovered, it is therefore very evident that neither of these sources caused the fire.

It has been and is yet claimed by some persons that the fire was owing to spontaneous combustion, and accounted for from the fact that some seven years ago two of the breasts had been partly filled in with coal dirt or culm, and had been carried down the breast, through the breeches or crop falls, by a stream of water from the surface. This is advanced and held to be sufficient grounds, by many of our mine officials, to base their opinions of the fire being caused by spontaneous combustion. This might possibly be a correct theory if any elements of substantial proof could be adduced that would be satisfactory to sustain its correctness. In conflict with this theory there is ample evidence existing throughout the anthracite region to prove its incorrectness. There are hundreds of collieries working and abandoned that have tens of thousands of tons of dirt or culm stowed away in old worked out sections for quite a number of years. I know of collieries where the mammoth vein has been worked, and have seen, in places where the coal was soft and dirty and of no benefit to the miner to attempt to send it out, as there were screens arranged at the bottom of each chute, a little above the platform, the openings of which between the bars, were one and a half inches, so that whatever passed through was their loss, as they received no compensation for it, they therefore stowed it in the gobs, as requiring much less labor, than to push it down the chute on sheet iron, the pitch or angle was not sufficient to carry it by its own gravity.

In places of this character, I have seen breasts ten yards wide, with exception of chutes filled to the height of from ten to twenty feet with this refuse. Although this came under my notice over twenty years ago, yet no fire has been discovered or known to exist up to the present time.

However, in the consideration of this subject of mine fires, claimed to have been caused by spontaneous combustion, I do not propose to treat it as being alone an underground problem.

The same material and conditions exist upon the surface to a much greater extent than those underground, therefore, having the same causes, the same effects should follow, no matter whether above or below the surface.

The immense banks, or rather mountains of refuse, waste, or culm throughout the anthracite region, estimated by some authorities as containing over forty millions of tons. Personally, we know of many of these refuse banks, the production of single collieries, that contain from one hundred to five hundred thousand tons, piled up to a height of from fifty to one hundred feet, containing all the elements or ingredients claimed to be contained in underground workings at Kehley Run colliery or elsewhere, that would produce fermentation, thereby generating heat and fire, yet there has never been any proof produced that the foregoing recited conditions has caused fire in these banks.

While it is true that there many of these waste banks on fire, although it would be safe to state that they do not exceed five per cent. of the whole, yet in every instance the cause of the fire can be accounted for, being the result either of dumping hot ashes from the boiler furnaces, dump men and driver boys building fires on the bank, mountain fires, or some equally good reason for its existence, but in no case has it yet been shown, by any proof whatsoever, that the fire originated from spontaneous combustion.

Another reason advanced as the cause of the fire in Kehley Run colliery was, that the coal dirt, culm, &c., that had been washed into the breasts contained more or less timber, that this timber decaying produced the requisite chemical action necessary for fermentation. Does not the same state of facts exist in all the old collieries that have been referred to?

Is it not a well known fact, to all conversant with the mining region that millions of feet of all kinds of timber are buried in and underneath the waste banks?

Therefore, these abandoned underground workings and culm or waste banks, having had, in the majority of cases, a greater number of years to develop fire than the breasts of Kehley Run colliery, then this theory of timber being the agent in producing spontaneous combustion, to be a correct one, should prove itself by all being now a seething mass of fire, which not being the fact is indubitable proof of its correctness.

The facts developed in connection with the discovery of the fire at Kehley Run do not support the theory of spontaneous combustion, but on the contrary tend to prove its fallacy. All the indications went to prove that the fire started near the battery or about the bottom of the breast, and not in the center of the mass of débris, as evidently should have been the fact, to accord with the natural laws governing combustion from spontaneous causes. Had the fire originated in or about the center of the breast that contained the dirt or waste, it is certain that it would have reached the old water level, long prior to its reaching the gangway below, this also, to accord with natural laws, as it is an incontrovertible fact that fire burns much more rapidly upwards than in the contrary direction or downwards.

Take, as an example, a heating or other stove having six inches of coal in the bottom or next to the grate, place kindling wood on top of this, and, although there may be six times the height or quantity of coal heaped above the wood, yet upon igniting it, the coal on top or above the wood will be consumed first. Now, this fact is so indisputable and well known that the precaution is almost invariably taken to clean out or remove all coal or other material and to place the kindling material next the grate or underneath the coal. It may be possibly claimed that the fire in the breast rolled down to the lowest point, which claim we would admit of, if there was space for it to do so; but if the opening was full of refuse washed down by water as has been stated, how could it have done so? and would it not be just as possible to roll up as down?

Notwithstanding all the time that has elapsed since the discovery of the fire on the 9th of August, up to the time of my latest visit, about the last week of December, a period of almost six months, the fire had not extended upwards to the old water level.

Rumors were rife about the time of the discovery of the fire, that hot ashes had been dumped into the breaches or crop falls; that a grate with fire in it had at one time been in the breast, and again, that the mine had been set on fire by some malicious person in revenge for not being employed at the colliery. Although these were probable causes, yet upon investigation I could not find any evidence to sustain them.

On the 9th of August, or thirteen days after the death of Wasley, Reese, and Willman, all doubts as to the cause of the accumulation of gas by which these men were overcome, were removed, by the discovery on that morning by one of the employés coming out of the gangway seeing fire rush down one of the chutes of No. 8 breast, which breast was located about five hundred and forty feet west of old slope, marked "A," on the accompanying sketch, or two hundred and thirty-six feet west of new slope, marked "G," on sketch.

Telegrams were immediately sent to the owners and officials connected with or interested in the lands and collieries adjoining that of Kehley Run, which led to a meeting and consultation of those representing the several interests endangered by the fire.

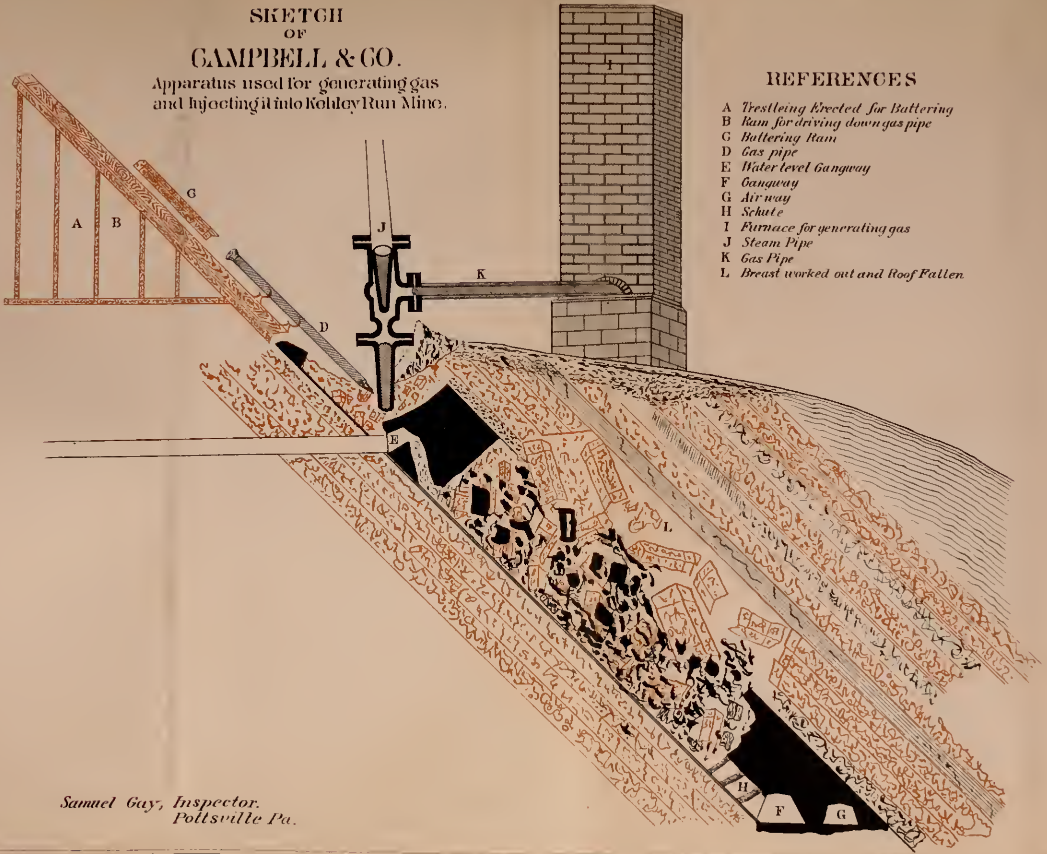
An agreement was effected that the management of introducing and carrying out such measures as would extinguish the fire, should be given in charge of the mine officials of the Philadelphia and Reading Coal and Iron Company, and which they accepted. The plan determined upon by them was to extinguish the fire with water; that upon the temperature of the burning mass becoming reduced sufficiently low by the flow of water to then commence drawing out and removing to surface all heated and dangerous material.

To carry this plan into effect, connections were made with three-inch gas pipe to the main steam pump, twelve in diameter, six feet stroke, having a capacity of about five hundred gallons per minute, under pressure of about one hundred pounds per square inch, the line of pipes to be thence laid to within about one hundred and fifty feet (150) of the fire, this latter distance to be supplied by two and one half inch leather hose.

Before this pipe to conduct the water from the pump to where the fire existed could be laid by the workmen, it was found necessary to establish a system of ventilation, as the gases given off by the fire, which filled and extended out the gangway to point marked "I" on sketch, would prevent workman from entering there.

To accomplish this ventilation, a line of brattice was started in and running parallel with the gangway, dividing it into about two equal divisions, connecting it with back gangway or return airway, at point marked "V," on sketch, and which was connected with the sixteen feet ventilating fan. The progress made in putting in this brattice was very slow, and much more dangerous than had been anticipated by its projectors, as the workmen engaged could but rarely advance more than from two to three feet ahead of brattice; occasionally falls would occur, forcing back large volumes of the vitiated and poisonous air, time and again blocking the ventilating current that was becoming weaker, as the brattice was advanced, from leakages and friction, and thereby causing the work, which, under favorable circumstances, could have been done in twenty-four hours, to occupy a week in its completion. Owing to these difficulties, much very valuable time was lost, and during which the fire was rapidly increasing in area and intensity, telling rapidly upon the small thin pillars which were being expanded by the force

SKETCH
OF
CAMPBELL & CO.
Apparatus used for generating gas
and Injecting it into Kohley Run Mine.



REFERENCES

A *Trestleing Erected for Battering*
B *Ram for driving down gas pipe*
C *Battering Ram*
D *Gas pipe*
E *Water level Gangway*
F *Gangway*
G *Air way*
H *Schute*
I *Furnace for generating gas*
J *Steam Pipe*
K *Gas Pipe*
L *Breast worked out and Roof Fallen*

Samuel Gay, Inspector.
Pottsville Pa.

Pennsylvania, for the Year 1880.
TN 823.P4 A2 1880 1881

of the heat, causing large bodies of material to fall from top and sides and materially increasing the flames.

Another source of danger at this time very much to be feared, was a crush, which evidently would result from the destruction of the supports, already weak, and necessarily imperiling the lives of those engaged in that part of the mine.

On the night of the 12th, No. 6 chute was reached with the brattice and water-pipes, and the timbers found to be on fire, which was extinguished by water from the hose. On 13th the head of the chute was reached at which point the mass of fire could be seen in breast No. 7 through cross-heading, between breasts Nos. 6 and 7. Arrangements were then made to throw two streams of water upon the fire, one line of hose, with one and one quarter inch nozzle, being placed in the chute and directed through the cross-cut, sufficiently close to the fire as to receive the full force of stream; the second line of hose, with same size nozzle, was placed in the gangway. Both lines of hose and nozzles were secured to props, so that when the water was turned on it would play upon the fire without being held, or requiring the presence of the workmen. This precaution being necessary, owing to the steam that would arise from the streams of water coming in contact with the fire, which would drive the workmen from such positions as would be required to be occupied by them to have the force of water reach the body of the fire.

While this work was progressing underground, a large force were, at the same time, employed on the surface, working night and day, in filling up and closing the breaches or crop-falls, extending from about No. 18 breast on the west, to No. 7 breast east.

On the morning of the 13th all the openings were temporarily closed, with the exception of an air shaft, "N," connecting with No. 8 breast, which served as an escape, or rather was a safety valve to that portion of the mine where the men were employed at the fire inside.

This opening I deemed a necessity to secure the safety of the men employed at the fire, and remonstrated with those in charge against having it closed, although they persisted in closing it, with the following result: Three or four hours after its being closed, the gas began to fill up the old workings in the rear of those employed at the fire, driving them out of the old traveling road, near the gangway, marked on sketch "F," where they were engaged putting in some stoppings. Another reason for my objecting to its being closed, was the great danger to be anticipated from falls that were frequently occurring, should which falls take place during this critical period, the result, in all human probability, would have been fatal, as evidently the displacement occasioned by the fall would drive large volumes of the vitiated and poisonous air down the old traveling way, at which point it would become mixed with the intake ventilating current in the rear of those employed at the fire, thus cutting off their only means of escape from suffocation.

That this impending danger should be removed, I requested the uncovering of No. 8 breast air hole, marked "N," that upon neglect or refusal to comply with this request, I should insist upon having the men brought out of the mine, as, in my judgment, their lives were in imminent danger.

Mr. Ormrod assumed the responsibility of opening the air shaft, remarking that it was in opposition to his wishes that it was closed, directing a workman to remove the covering, which consisted of two-inch planks, they being covered with about four inches of clay. While thus engaged removing the covering, there were indications that the gases pent up were under considerable pressure, as evidenced by the escape of gases from small apertures or leaks, carrying particles of the clay and gravel that covered the planks two or three feet upwards.

This pressure was due to the high temperature the gases were subjected to by the burning mine. At this time an unexpected phenomenon occurred, in the explosion of the escaping gases, by being ignited by a lamp held in my hand. I did not see any flame, nor did I feel any of the effects of fire. Some of the persons present said they had seen the flame, yet I doubted the correctness of their statements, until shortly afterwards, seeing the plank around the opening, which had become as dry as tinder from the intense heat, burning.

Of all the subsequent events that have taken place in connection with the fire, this was the least expected, from the fact that the mine did not, nor never had, generated carbureted hydrogen gas. Up to this period a safety lamp had never to my knowledge been used in or about the colliery. In an examination of the mine, immediately after the deaths of the superintendent and companions, a bottle containing the gas was procured and sent to Professor Lesley, of the State Geological Survey, and by him forwarded to Prof. D. F. A. Genth, analytical chemist of the University of Pennsylvania, who made the following return:

"I have made an analysis of the gas contained in the bottle, and found it to have the following composition:

Sulphureted hydrogen,	trace.
Carbonic acid gas,	9.72
Oxygen,	16.42
Nitrogen,	73.86
	100.00

There was no carbonic oxide or other gas present * * *."

The explosion of gas at air hole caused an immediate change in the plan first adopted to extinguish the fire, that is, by throwing water upon it.

It was now determined to attempt the sealing up of the mine, and turn steam into the inclosed or sealed up part from the boilers connected with the colliery, twenty in number, thirty feet long and thirty inches in diameter. Batteries were erected, cutting off communication between that part of the mine on fire and other parts.

On Sunday morning, 16th August, the steam from ten boilers was being forced into the inclosed portion of the mine, and during the following week the steam from the balance of the boilers was turned on.

This was continued without any unusual occurrences until the first of September, when between four and five o'clock in the afternoon another of those inexplicable explosions occurred with serious results. One of the inside bosses (Simon Gregory) lost his life, the principal inside boss and one of the carpenters were taken out in an unconscious condition; the general superintendent and pumping engineer, who had accompanied him into battery marked on sketch "I," were severely cut and bruised. The following facts were gleaned at the investigation from the testimony of Mr. Ormrod, superintendent, and Mr. Jones, engineer: Mr. Ormrod went down the slope about four o'clock to see how the men were progressing with work required at battery "I;" Jones, who was at bottom of slope accompanying him, having given such orders as he deemed necessary, he and Jones returned towards the slope bottom. When opposite the traveling way "F," it was remarked that there was a strong odor of gas, and knowing from past experience its deadly effects, concluded to try and ascertain where the leak, from which it was escaping, was located, that they might stop it. Jones in examining the battery in bottom of manway with his light, found a leak on the bottom under the planking and close to the bottom slate, the aperture being about two inches in diameter. His light coming in contact with the escaping gas ignited it, burning with a flame around the aperture. He attempted to knock it out with his cap unsuccessfully, when suddenly the explosion occurred, blowing out the battery in bottom manway where Ormrod and Jones where standing, as also several other batteries built of plank and one of brick between main airway and old water level workings. In fact everything from battery "I" to the bottom of the slope indicated that there had been a heavy concussion of air. Yet, strange to say, not a vestige or trace of fire or flame could be discovered as having come in contact with the planks or timbering, nor had even a hair upon either of the men been singed by it.

During the period that steam was being used for the extinguishing of the fire, powerful influences were being brought to bear by manufacturers of gas machines to induce the operators to enter into a contract to accomplish it by filling the mine with carbonic and nitrogen gases, in the securing of which contract A. Campbell & Co., a Pittsburgh firm, were successful, upon the following terms: Campbell & Co. to receive the sum of twenty-five thousand dollars ($25,000), upon condition of extinguishing the fire within thirty days from the signing of the agreement, with a further proviso that they should have thirty days additional to operate on the mine, to pay fifty dollars ($50) per day for each additional day thus allowed by the owners, Thomas & Co. The said contractors, Campbell & Co., to pay all expenses incurred for labor and material, and at the expiration of the sixty days agreed upon, they failing to have extinguished the fire, to pay the forfeited per diem sum of fifteen hundred dollars to the owners, Thomas & Co.

The process proposed by Campbell & Co. was to pass a volume of air through a bed of burning charcoal, whereby the oxygen it contained would be removed, forcing the remaining constituent parts down into the inclosed portion of the burning mine.

The building of furnaces to generate the gas, as above recited, and such other arrangements as were deemed necessary by the contractors, were immediately commenced to put the proposed process in operation, as shown in the accompanying sketch. To have the gas reach the fire direct from the generator proved much more difficult than its projectors anticipated. The first plan adopted was to drive a three-inch gas pipe down the breast through the debris that had accumulated therein from falls or otherwise, consisting of rock, coal, slate, and other material.

The driving of this pipe was commenced at No. 6 breast, with a battering ram erected for that purpose. After several unsuccessful attempts, each time losing the larger part of the gas pipe that had been prepared with steel points affixed at the end for piercing rock or coal, it was deemed advisable to change the operation to the breach in No. 7 breast.

Here they met with the same resistance and consequent failure as that in No. 6 breast, and then removed to No. 8 breast, where they succeeded in driving the pipes some seventy or eighty feet, when similar obstructions were met with, and all hopes of reaching the fire with the gas pipe, as contemplated, was then abandoned.

However, Mr. Campbell had such implicit confidence in the action of the gas, no matter at what point in the mine it was discharged, even if near the surface, that it would eventually reach and extinguish the fire, that he had connections made between these pipes in the breast and the generating furnace, and then commenced the forcing of gas into the workings above water level.

A second line of pipe was run down through a hole that had been drilled by the Diamond Drill Company for that purpose, 140 feet in depth, opening out in No. 8 breast, about 80 feet up the pitch above the gangway.

A third connection was made with one of the lines of gas pipe that had been used to convey steam into the inclosed section of the mine. The gas was then forced into the mine through the three lines of pipes above described, and continued until within a day or two of the expiration of the time agreed upon in the contract, when the following discovery was made: On the 10th of October some workmen who had descended the slope and gone from the bottom west a short distance, when their attention was attracted by a body of fire burning in the gangway. This they immediately reported to the officials in charge, who at once visited the mine, and upon their arrival at the point where battery "I" had been built, were astounded to find that it was nearly destroyed by fire, and the whole surroundings fiercely burning. The effect Messrs. Campbell & Co.'s gas had upon the fire was here fully illustrated, and very conclusively shown to be a complete and disastrous failure. One of the barriers burnt out, all combustible material in the surroundings inside in flames, the gas jet still discharging into its midst without any more effect than to have blown into it with a blow pipe, was evidently ample proof that the fire, instead of being extinguished, as claimed by Mr. Campbell, had, on the contrary, made rapid progress, and extended its area westward nearly two hundred feet.

Although Mr. Campbell claimed at the time that this was not the original fire that had thus increased and extended to the point where now seen, but that the fire had been caused and was attributable to the explosion that occurred at the time of the examination of the battery by Messrs. Ormrod and Jones.

That this latter claim could not be sustained was fully and conclusively shown by the facts that the explosion occurred on the outside of the battery, that it was now destroyed by fire from the inside, and that on the occasion of the explosion as before stated, no indications or evidence whatever existed or could be found that any fire was caused by it.

Notwithstanding all the confidence felt or expressed by Messrs. Campbell & Co., and others, in the effective results to be attained or produced by the use of gas, now standing within a few feet of where the battery once stood and there witnessing the fire burning fiercely, two hundred feet east of the place it existed when they commenced operation, some sixty days prior, with their gas apparatus, and even now the supposed gas passing through the supply pipe into the fire having the apparent effect of increasing or fanning the flame were incontestable facts that controverted all claims or theories favoring their underground fire extinguisher, and most assuredly destroyed all their fond hopes of world-wide fame in gas.

I have here given as concise and authentic description or history of the fire as the circumstances would admit of, with the several methods or plans employed for its extinguishment, and their failure, avoiding as much as possible any criticisms, or the advancing of reasons for their failure.

I now propose to give my views upon each of the methods or plans employed, commencing with that of the Philadelphia and Reading Coal and Iron Company's officials, the first employed.

This, in my opinion, would have been successful had the fire been reached by the appliances for its extinguishment within twenty-four hours from the time of its discovery.

The gangway to be kept free from obstructions, so that the rolling stock of the colliery could have been employed in removing the burning debris as rapidly as it became cooled off by the streams of water playing on it from the hose.

This could have been accomplished by changing the ventilating apparatus from an exhaust to a forcing power fan, thus avoiding the building of a brattice in gangway, and its consequent delay, the main avenue to the fire being then clear for all purposes.

The change required in the ventilating machinery, and all other necessary arrangements to conduct the whole volume of air through the gangway to the old breaches or crop-falls, west of the fire, which would serve as the upcast for the gases and vitiated air to pass off could, without any doubt, have been completed within ten hours, and operations to cool down and remove the fire commenced. Had this been done, I contend that the fire would have been got under control and extinguished within a limited period, property, money, and time saved, and the colliery now producing and shipping coal.

STEAM AS A FIRE EXTINGUISHER.

The value placed in steam, particularly by colliery officials, as an agent to extinguish underground fires, is given too great an importance, in our opinion, when consideration is had of the component parts of water, which are eight ninths oxygen to one ninth hydrogen, both inflammable, therefore, we fail to see wherein such great importance should be given to steam so far as it is applied as an extinguishing agent of underground fires.

There is also another important element contained in steam that depreciates its value for this purpose, that being its tendency to condense when coming in contact with any surfaces under 212° Fahrenheit. Were it possible to confine underground fires within a fixed space or area, and a sufficient volume of steam forced into this inclosed section so as to raise the internal pressure or density greater than that existing externally, whereby the air inside would be expelled, and that without debarred, then under such conditions fire could not exist, as it would be deprived of that element which is necessary to support combustion. Therefore, when the elements that compose steam are taken, in connection with the conditions that necessarily attach to its surroundings in this matter, into consideration, is it not more a surprise than otherwise, that steam should be so favorably accepted as an agent in the extinguishing of mine fires.

We hold that it was impracticable at Kehley Run to comply with the natural laws or governing principles to accomplish a successful termination by the forcing of steam into the mine, owing to the large cavity or area that required to be filled ere there could be any possible hope of success.

This area has been estimated as containing ten millions cubic feet, of which at least seventy-five per cent., notwithstanding the heat generated by the fire, did not exceed a temperature of 80° F. The evaporating surface employed for generating steam for filling above space was about eighteen hundred square feet, or less than one foot of evaporating surface for about every four thousand feet of condensing surface, assuming the above estimate to be correct. Although estimating the condensing surface much greater, yet I think this sufficiently near for the purposes intended.

In addition to the above large area of condensing surface there was a large area of outside surface that was breached by crop falls, and that had been newly filled up with loose material, through which the gases generated and rarefied by the fire escaped at the most elevated points.

The partial vacuum produced was supplied by leakages from the lower levels through imperfect stoppings and broken pillars that were impracticable to make secure. During the time the steam was being forced into the burning portion of the mine, the indications were that the pressure or density was not increasing, but that the steam was being condensed and the gases escaping through the porous surface. As an evidence of this, whenever the water gauge was applied at the lowest points it developed the fact that the internal density varied from three to five pounds per square foot; below that existing externally. These reasons of positive failure were advanced by me during the inception of the scheme, based upon the foregoing hypothesis, all of which the facts as recited proved to be correct.

On the 29th of August, fifteen days after the steam had been turned on, and a day or two prior to forcing in of gas, having conferred with Messrs. Ormrod & Hemingray, it was determined to open the battery located between breasts Nos. 21 and 22, west of the fire.

This action was taken that all doubts might be solved in respect to claims made by some parties that the steam had, *or nearly so*, extinguished the fire.

The battery proposed to be opened had been built with a double course or wall of two-inch plank. A space of ten inches between the courses or walls was filled with sand, having bored a two-inch hole through the battery. This for the purpose of ascertaining the difference existing between the internal and external density. The latter was found to be about three and a half pounds greater than the former. An opening was then made through which I entered, accompanied by Mr. Hemingray and, I think, three other persons. We found the water in the gangway at battery about three inches deep, increasing in depth as we proceeded east, or towards the seat of the fire, but at no point any indications of steam.

Mr. Hemingray and I reached a point about one hundred yards west of the fire, at which point the effect of gas could be felt, and deeming it more prudent to return than to press our investigations further at the risk of life, we retired, satisfied that the condensing surface was of that extent that all the steam that could be evaporated by a generating power ten times greater than that employed would be condensed. We also discovered that the barricades or stoppings were sufficiently open to allow the gases to escape as generated.

Gas as a Fire Extinguisher.

That carbonic acid gas will not support combustion is a fact so well known as to be beyond dispute. The same can be stated in respect to nitrogen gas. Therefore, there can be no possible question as to the effects the injection of these gases into the Kehley Run mine would have had upon the fire, provided, however, that a sufficient quantity, or rather an excess of these gases in a pure and undiluted condition, could have been forced into the inclosed section to have increased the internal density above or greater than that existing externally.

This, in itself, could it have been successfully accomplished, would have secured the stoppings or barriers against the supply of oxygen to the fire, without which the fire could not have existed.

These conditions were as necessary for Messrs. Campbell & Co. to attain success as would the closing of the bung-hole of a barrel in order to fill it through the spigot-hole, and could they have secured those conditions their success would have been as well assured as though it had been flooded with water.

They failed to secure those important conditions, particularly that of overcoming the waste or loss, which was much greater than the supply, and could not well be otherwise, owing to the many interstices existing through which the gas escaped.

Freshly filled-in crop falls, broken surface, crushed pillars, and insecure stoppings, presenting a section of the mine containing many thousands of feet in area that admitted all the air required to supply the fire, and egress to the gases generated.

The retention in the burning section of the mine of the gas injected was a positive requirement to assure any measure of success. This could only be accomplished by injecting into it a much larger quantity than was lost by leakage, thus increasing the internal density above or greater than that existing externally, which, as heretofore stated, the Messrs. Campbell failed to do, and therefore signally failed.

Had it been practicable to have hermetically sealed the mine, or at least that section where the fire existed, it would not have been necessary to have then employed any of the expensive devices to extinguish it, for the fire itself would have generated the elements necessary for its own destruction.

In my connection with and about mines, covering a period of over thirty years, I can safely assert that during that whole period of time I never came in contact with any person or persons so lamentably deficient in either practical or theoretical knowledge of a business or project they were about to undertake as were Messrs. Campbell & Co. of the contract they had agreed to perform, involving, as it did, money and property interests in very large amounts, and difficulties to be overcome of immense magnitude.

To reach the fire by means of gas pipe, driven through the breasts, that were closed by falls, as proposed by them at the time, was beset with difficulties which were pointed out, principal among which was the variation of angle; that the material filling the breasts was principally rock of the hardest character and of many hundreds of feet in area.

They were also advised of the difficulty of forcing sufficient volumes of gas into the mine to have any effect upon the fire, owing to the open character of the surface, and crushed or broken condition of the pillars, through which the gas would escape as rapidly as forced in, and the admission of an ample quantity of oxygen to supply combustion.

All this was met with the statement that it had been done in the Western States—that they would inject gas into the mine in such large volumes as to exceed that escaping.

Having examined the injectors that the gas was to pass through, three in number, the throat of the largest about one and a half inches in area, the other two each about one and a quarter inches in area, I stated to Mr. Campbell that he could not supply a sufficient amount or quantity of extinguishing gas through those openings or throats of the three injectors to fill the partial vacuum produced, and that unless this could be done the supply of oxygen through the broken pillars would be sufficient to supply combustion.

These statements raised the ire and voice of Mr. Campbell at the same time to a high pitch, replying " You may as well tell me I lie."

The facts as developed have proved the correctness of his reply as fully as it has the disastrous failure of gas as an agent to extinguish this fire.

Explosions of Carbonic Oxide Gas.

This is a matter so closely allied with the subject under consideration that I consider it of sufficient importance to receive more than the passing notice already given. I have referred to it as a phenomenon, in consequence of an explosion of gas having occurred under such singular circumstances. First. The mine did not generate fire damp, (carbureted hydrogen.) Secondly. The gases given off by the combustion of coal and other material caused by the fire, as analyzed by Dr. Genth, contained component parts as follows:

Sulphureted hydrogen,	trace.
Carbonic acid,	9 .72
Oxygen,	16 .42
Nitrogen,	73 .86

This mixture of elements contains nearly ten per cent. of carbonic acid gas. J. J. Atkinson, in his treatise on " Gases met with in coal mines," says, the presence of carbonic acid gas or of free nitrogen gas in mixtures of fire damp and air is found to lessen their explosive force, so that if there be added one seventh part of its volume of carbonic acid gas it will not explode. Therefore, had there not been other gas given off by the combustion of the coal and other materials that were being consumed by the fire, than that given in Dr. Genth's analysis, there could not have been an explosion. However, this we do know: That the bottle sent to him contained carbonic oxide, if other authorities are correct in relation to the peculiar odor given off by that gas. The men in company with me when the bottle was filled, can bear me out when I say the odor was very perceptible. Moreover, prior to the explosions and previous to the deaths of Messrs. Wasley, Reese, and Willman, the very fact of the workmen becoming indisposed in places, where lights burned as brilliantly as though they had been on the surface, shows conclusively that there was other gas present than that given in the analysis. This may have percolated through the imperfeet stopper that was intended to secure the neck of the bottle until it reached the laboratory.

The question now arises and has been frequently asked what caused the explosions. We have already stated that the mine did not generate fire damp, and it is an undeniable fact that the mixture given in the analysis was not explosive. From the very fact that such a compound is not inflammable. Therefore, I do not see any grounds to change the opinion expressed by me prior to the fatal occurrences, which was to the effect that the air was being fouled by carbonic oxide and it was that which exploded.

There is another feature connected with these explosions that is worthy of notice. That is the remote points at which they occurred one from the other. The first explosion occurred in the top of an air shaft located on the highest point of elevation, and ignited on the surface, whilst the second occurred at the foot of the old traveling way, in the lowest point on the gangway and was ignited next to the bottom slate. (The angle of these openings averages about 30°.) It was not very surprising that the first of of these occurred at the top of the air shaft as the gas was escaping therefrom in consequence of it (carbonic oxide) being lighter than common air. But when the second occurred at the bottom of the traveling way, apparently against the natural laws governing these elements, I must confess the whole matter looked very much complicated. However, when the difference in the temperature at the two different points under notice is taken into consideration, the subject is much less perplexing, especially when it is remembered that all avenues of escape on the surface had been cut off at the time of the second occurrence, or as perfectly secured as was practicable. This caused the gases generated by the fire to partially fill the working inclosed within the barriers and their readiest avenue of escape was through the old water level gangway to a point where it intersects or is connected with the traveling way in question. From thence the natural current or the current produced by the fan carried it downward to the point where it was ignited by the lamp of Mr. Jones.

SAMUEL GAY,
Inspector.

The Kehley Run Mine Fire.

At the time I took charge of the district, Messrs. Campbell, Connelly & Co., of Pittsburgh, were trying to extinguish the Kehley run fire. Their plan was to fill the mine with carbonic acid and nitrogen gases. On the morning of Sunday, October 10, the battery inclosing the fire, near the bottom of the slope, was burned while the process of injecting the gases was in operation. The contractors, finding their experiment a complete failure, gave up the attempt, withdrew their plant, and left.

The colliery superintendent, Robert Carter, Esquire, to prevent the fire extending in the direction of the hoisting slope, started to play upon it with a hose, attached to the pump column. This was energetically prosecuted, under the direction of Mr. Thomas Baird, the inside boss, and the fire was, in some degree, kept in check, and prevented from spreading so rapidly along the gangway. A battery had been built in the new slope and airway, thirty feet below the old slope level, covered with clay to the depth of thirty feet to avoid its being burned, to prevent the fire from passing down into the lower lift. On top, an attempt was made to open the traveling way, which was blocked with coal, with the intention to wash down loose earth and clay to fill up the breasts next the slope, and to prevent the fire spreading in that direction. While this was being done, an accident occurred in which five lives were nearly lost.

On the morning of Saturday, October 23, the men were down some forty feet from the surface, working to clear the traveling way. They were supplied with air from a hand fan. They had been working but a short time when one of them was overcome with the "fire stink," or the mixture of gases generated by the fire. The others, in trying to get him out, were also overcome, until the whole shift was lying insensible within forty feet of the surface, and in sight of those on top. They were rescued with great difficulty. Thomas Baird, the inside boss, was let down with a rope to save the last two.

The attempt to open the traveling way was then abandoned, and an effort made to make an open cut, with a view of getting down to the water level gangway to open the chain pillar. This was also a failure, the gas preventing the men from working even in the open cut.

Meanwhile an injunction was applied for in the court of common pleas of the county by Messrs. R. Heckscher & Co., of the Kohinoor colliery, to restrain the management from flooding, or partially flooding, the mine. The court appointed a "commission," consisting of Messrs. John R. Hoffman, A. B. Cochran, engineers; and Inspector Samuel Gay, to examine the mine, and report. These gentlemen visited the colliery on Friday, November 12, when an other explosion occurred, the particulars of which will be found in Mr. Gay's report. I now came to the conclusion that the men working at the bottom of the slope were not safe. I feared that the noise about the bottom when hoisting would prevent the men from hearing a fall or other indications of danger. I thought the fire was too close to the hoisting slope, and that the risk run in working the colliery was too great. I, therefore, notified the company's representative to stop the colliery, but permitted men to work who were engaged in extinguishthe fire, or keeping it in check. With this order the company complied at once, and the mules, mine cars, locomotives, and other movable plant were taken out. While this was being done on Tuesday, November 23, Thomas Jones, bottom man at the old slope, was sending up two empty cars, when a coupling broke. One of the wagons ran back, struck the bottom, and was smashed to pieces. Jones was struck by flying pieces, and received injuries which resulted in death a week later.

On Monday, December 15, 1880, I received a telegram from Major Heber S. Thompson, engineer of the Girard estate, inviting me to meet him at the colliery the next morning. On Mr. Thompson's arrival, he informed me that he had taken charge of the colliery as the representative of the Girard estate, and that he would commence at once to make preparations to extinguish the fire. We visited the mine to examine the location of proposed dams, &c., and held a consultation. William Booth, Esquire, inspector for the P. & R. C. & I. Co., was placed in charge as superintendent, with Mr. Thomas Baird as inside, and Mr. John Daddow as outside boss.

Work was commenced immediately, and is now being vigorously pushed, upon plans of Mr. Thompson. A detailed account of the plans adopted, with the results, cost of labor, material, &c., will be given in my next report.

ROBT. MAUCHLIN,
Inspector.

Legal Proceedings.

On the 15th of October, R. Heckscher & Co., owners of the Kohinoor Colliery, filed a bill in equity and praying for an injunction to prevent the flooding of Kehley Run Colliery, setting forth in their bill the following reasons:

That they were operating on the mammoth or big vein, averaging over thirty feet in thickness; that Kehley Run Colliery was operating on the same vein; that the two collieries had open connections by reason of the gangways of the Kehley Run Colliery having been run into and across the upper portion of the breasts previously worked out by Heckscher & Co.; that the flooding of Kehley Run will necessarily flood and drown out the Kohinoor; that it was not possible by any skill or devices within the limits of the latter to protect their colliery from the threatened flooding of the former, but that whether it was possible to do so by the erection and construction of any obstructions against the breaking of the pillars in Kehley Run Colliery and from inflow of the water from that colliery through the openings was a question that could only be determined by experts.

On the presentation of this bill a preliminary injunction was granted, and on 10th of November the following order was made by the court:

"And now, Nov. 10th, 1880, A. B. Cochran, Samuel Gay, and John R. Hoffman are hereby appointed to make examination and report, under oath, their conclusions and answers to the following questions:

"First. Can Kehley Run Colliery be flooded with water in the upper or first level in such manner as to reach the fire now existing there without danger to the lives of the persons employed in the colliery of Heckscher & Company, and without imminent peril of irreparable injury to the colliery of said Heckscher & Comp'y.

"Second. Has the first or upper level of the Kehley Run Colliery already been flooded? If so, to what extent? And what has been the effect upon the colliery of Heckscher & Comp'y?

"The examiners are invited to accompany their report with such suggestions as they may deem pertinent and proper.

" The above-named parties, plaintiff and defendant, have permission to send their own engineers with the examiners hereby appointed, if they so desire. The examiners hereby appointed are requested to report to the court as soon as possible and in writing."

The preliminary injunction to restrain the flooding of Kehley Run colliery was continued until further order. On 16th November the examiners filed in court the following report:

" In pursuance of our appointment, we visited Kehley Run colliery on the 12th day of November, 1880, and made examination of all accessible parts of the mine in our opinion pertinent to the instructions accompanying the same, and beg leave to submit the following report:

The method employed to extinguish the fire in Kehley Run colliery contemplates the erection of strong dams or batteries, two on the west gangways of the first lift, west of the fire, at the points marked "A" and " B," on the accompanying map, and two in the same gangways, east of the fire, at points marked " D " and " E," on the map, and flooding the working between "A" " B " and " D " " E " to an indefinite level trusting the dam in the new slope at " C," which was built some time ago and is now inaccessible, the fire having passed that point.

We therefore collected information bearing upon this and other points not now accessible, without making special openings for the purpose, from men engaged in the work, records at the colliery, and memoranda of the foreman. From these sources we learned that this dam is erected in the new slope, thirty-five feet below the level of the gangway, and consists of rows of eight props of pine timber, about fourteen inches in diameter and ten feet in length, extending at top and bottom about six inches in the solid, supported by three other props placed five feet below to correspond with the three center props of the row above, and braced in the middle, covered by three inch planks and the plank covered with floor boards, upon which is laid a coating of cement and then clay to the level of the gangway.

We believe this dam to be of sufficient strength to sustain a head of water thirty-five feet vertical, but not sufficient to sustain a pressure occasioned by the flooding of the upper level, so as to extinguish the fire.

In answer to the second question: " Has the first or upper level of the Kehley Run colliery already been flooded; and, if so, to what extent?" we say that as a natural consequence of the construction of the dams at " D," " E," the gangway has been flooded to the depth of four or five feet at these points, extending westward to breast 21, where it is about sixteen inches in depth, but so far as we have been able to ascertain no water from this level has as yet passed into the workings of Heckscher & Co.

" Owing to the destruction of the new slope of the Kehley Run colliery all means of removing water from the lower lift has been cut off; hence, the water in that level, accumulating from natural causes, after raising to a height of about fifty feet vertical, will pass through the openings connecting Kohinoor colliery with Kehley Run colliery about one thousand yards west of the new slope. However, the water already accumulated there has not been an injury to the Heckscher colliery, but a protection against the gases generated by the fire in the upper workings.

We believe the fire may be brought under control and confined within certain limits by cutting off the entire section of vein from the surface to old slope gangway at breast 22, and at air hole or slope, or at other points to be determined, and filling up the excavations with earth, allowing the water to rise above the roof of gangway to the first heading or thereabouts, and as a precautionary measure to prevent the water rising higher than level named (35 feet) above bottom of gangway. Measured vertically, a three-inch pipe can be connected to that in battery and leading up the slope, causing it to overflow at the height above named, (35 feet.) A similar pipe can be attached in heading.

"In our judgment, the most effective plan that can be adopted to extinguish the fire at Kehley Run colliery is to flood the mine.

"This can only be done by cutting off all connections between the two collieries, for the reason that the top of the Kohinoor shaft is about one hundred and sixty feet lower than the top of the Kehley Run slope, and the water would not rise to a sufficient height to flood the Kehley Run colliery before it would run out of the mouth of Kohinoor or Heckscher's shaft.

"We are of the opinion that dams may be built of sufficient strength in the west gangway in the first lift at the points "A" and "B," and another in the second lift gangway at the point marked "G," or thereabouts, to retain the water necessary to flood the colliery to extinguish the fire now existing at Kehley Run colliery, if upon careful examination the pillars, &c., at these points are of the thickness and character represented.

Submitted and signed by

A. B. COCHRAN,
SAMUEL GAY,
JOHN R. HOFFMAN.

On the 24th of November the Court made the following order:

Recognizing the necessity of prompt action in the above case, owing to the vast amount of valuable property involved, and the great risk to human life that may be occasioned by careless or improper action upon the part of the owners or employés of Kehley Run colliery, in an attempt to extinguish the fire now existing in the same, the Court has determined to make the following order, to wit: The preliminary injunction heretofore granted is hereby continued, (except as hereinafter modified,) upon the plaintiff's giving security in the sum of five thousand dollars, with sureties to be approved of by the court.

The injunction thus continued is hereby modified so as to permit the defendants to flood the first lift gangways to the height of thirty-five (35) feet, vertical, and for this purpose they are permitted and directed to erect two dams or batteries west of the fire, in the first lift gangways at the point marked "A–B" upon the map attached to the report of the special examiners, and also two dams or batteries east of the fire, at the point marked "D–E" upon said map.

These dams to be so constructed, erected, and secured as to be entirely sufficient to confine the water intended to be placed between them in the first lift gangways. For the purpose of preventing the water in the flooded portion from rising to a greater height than thirty-five (35) feet from the bottom of the gangway, it is directed that a three inch pipe be attached to the pipe now in the battery, and conducted up the slope in such a manner as to cause the water to flow out whenever it has risen to the height of thirty-five feet in the flooded portion, and if necessary a similar pipe may be attached at the heading.

Before the first lift gangways shall be flooded to any greater extent than above allowed, there shall be erected and securely constructed, in the second lift gangway (if the pillars and workings on this level are of the character represented,) a dam, at or near the point marked "G" on the map attached to the report of the special examiners. Every precaution shall be taken to secure the lives of the employés, of both collieries, and to this end the superintendent and engineers of Heckscher & Co. shall be permitted to enter the Kehley Run colliery at any and all times to examine the workings and ascertain the sufficiency of the same.

The Court reserves the right, upon the sworn application of the engineer or engineers of either plaintiffs or defendants, to direct further examination by one or all of the special examiners heretofore appointed, and to make such further order as may be necessary.

By the Court.

Immediately following this order, or on the 29th of November, one of the firm of Hecksher & Co. filed an affidavit in the court, that the water accumulations on the Kehley Run old slope gangway could not be confined to said gangway, but found its way through cracks or crevices into the new slope gangway, and thence into Kohinoor colliery. That when such leakage or sinking away first took place, the water which had accumulated on the gangway in question could not have exceeded a vertical depth of ten feet. That while the water was rapidly receding from Kehly Run gangway, the quantity of water to be pumped or raised from the Kohinoor colliery shaft was more than three times its usual volume and in part lukewarm, and that work at this colliery had been materially interfered with by this water.

The Court, upon the same day, made the following order:

And now, November 29, 1880, the Court hereby refer the within affidavit to the examiners heretofore appointed, and direct them to examine into and report to the Court upon the facts therein stated. And also direct and authorize them to examine into and report upon any other facts at the request of either party.

This was attended to by the examiners, who reported as follows:

* * * * "The workings of the Kehley Run colliery at Shenandoah

are principally on the south dip of the mammoth vein, and consist of an abandoned water level drift and two slopes, the old slope being sunk one hundred and thirty (130) yards on a dip of about 45°, and gangways opened to the eastward and westward.

"A new slope was sunk about seventy-five (75) yards west of the old one, and about eighty (80) yards deeper than the old slope level, and gangways driven east and west.

"The west gangway on this lift is driven upon an ascending grade in order, as we have been given to understand, to keep it within the limits of the lands owned by the city of Philadelphia. It is about fifteen hundred (1500) yards in length, and near its western end is about fifty to sixty (50 to 60) feet higher vertically than at the bottom of the slope. The mammoth vein is here about fifty (50) feet in thickness, and the coal firm and solid.

"The Kohinoor colliery is located about three quarters of a mile southwest of the Kehley Run colliery, and its workings are upon the same vein and dip. A shaft one hundred and thirty (130) yards in depth reaches the mammoth vein at a point considerably lower than the Kehley Run workings. East of the shaft an incline plane is opened to a counter level, which has been worked under the Kehley Run mines, and some of the breasts are driven up into the west gangway of the new slope level of that colliery at a point about one thousand (1000) yards west of the new slope.

"The two collieries being thus connected, and the upper part of the Kehley Run colliery having been destroyed by the fire, rendering it impossible to lift the water to the surface, as a natural consequence all the water which finds its way into the deep slope workings of the Kehley Run Colliery (after the water has reached the height of about fifty (50) feet vertical above the bottom of the slope) will flow into the workings of the Kohinoor colliery.

"At the time of our examination some water was flowing from the Kehley Run workings into the Kohinoor colliery, but not in sufficient quantities to be of a serious nature, or to cause any damage.

"This water we believe to be only that which naturally accumulates in the Kehley Run workings; as no water is now being put into the mines, either to flood the colliery in any way or to extinguish the fire.

"The water in the first lift, east of the old slope, however, is pumped up and thrown on the slope pillars for the purpose of cooling them. We have no means of ascertaining definitely whether or not the water in the old slope level workings finds its way through a leakage in the dam erected in the new slope, or through cracks or fissures in the coal of the chain pillar between the first and second levels, all points being inaccessible. From the fact that the water in the upper level (which had reached a height of about five feet) has become less, and from statements of the engineer engaged in hoisting the water at the Kohinoor colliery, and others, we believe the unusual quantity of water flowing from the Kehley Run mines at the time alleged by Mr. Glover, found its way from the upper level into the new slope workings by one of the ways above mentioned, and from thence into the Kohinoor colliery.

" Since our former visit to the Kehley Run colliery, on the 12th day of November last, the fire has made alarming progress.

" The battery (referred to in our former report and marked " D " on the map accompanying it) in the first lift gangway, ninety-five (95) feet west of the old slope, is now partially burned away and must quicky be entirely destroyed, and is of no service whatever, either for the purpose of retarding the progress of the fire or flooding the colliery in any way, and with its destruction there is no obstacle to prevent the fire from extending rapidly eastward and destroying the airway and old slope, which is inevitable.

" About thirty yards east of this slope in the tunnel, leading to the Buck Mountain vein, preparations are being made to erect a brick dam for the purpose of checking the fire in that direction ; the fire may, however, destroy the slope before its completion, and it would then find its way into the workings of the veins back of the mammoth. West of the new slope there is danger to be anticipated from the giving away or breaking of the chain pillar between the old and new slope workings in consequence of the fire burning out and destroying the pillars in the first lift, which will naturally bring on a squeeze or crush on the chain pillar below ; in this event the fire will extend into the new slope workings, and from thence communicate with the workings of Heckscher & Co., and its consequences cannot be estimated, as all efforts to extinguish it will then be futile. Under these circumstances, we think it proper at this time, to renew our former suggestion in regard to the fire.

" In our judgment an effort should be made to extinguish it by flooding Kehley Run workings, if the pillars in the lower lift are of sufficient thickness and the coal in the vein strong enough for the purpose. In view of the danger above referred to, this should at once be ascertained and operations in that direction should be commenced without delay.

" If the fire should communicate with the lower lift workings, it would render them inaccessible for any purpose, and the dams required could not be erected. An opening should be made at some suitable place, west of breast 22, from the surface through the breasts, and chain pillar to the new slope gangway, and the water removed, and the dams erected.

" Two pillars in the lower lift may be used instead of one, by erecting two dams in the gangway, one at each pillar, and filling the space between the dams, as well as the breast above, with clay. This would add additional strength, and aid in sustaining the great pressure of water."

This report of the special examiners was followed by an application of the counsel of the city of Philadelphia to the court, and its action thereon as follows :

" The counsel of the city of Philadelphia, one of the above defendants, moves the court for permission to make efforts to extinguish the fire now existing in Kehley run colliery."

The counsel of the Thomas Coal Company being present, made no objection to such order.

An examination of the order of court, November 24, 1880, will show that nothing therein contained prevents the city of Philadelphia from making such effort, provided the provisions of said order be observed.

Since, however, there seems to be a misunderstanding as to the meaning of said order. The following order is now hereby made, to wit:

"And now, December 13, 1880, it is now hereby ordered that the city of Philadelphia, one of the above defendants, shall have full permission to make earnest efforts to extinguish the fire in said Kehley run colliery; but it is directed that the provisions of the order filed November 24, 1880, be constantly, carefully, and faithfully observed."

Immediately after the court making the above order, Hebur S. Thompson, engineer in charge of Girard estate, commenced preparations to subdue the fire by flooding, as recommended by the examiners, and approved by the court.

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REGISTER OF FATAL CASUALTIES.

Dates.	Names of Persons fatally.	Occupation.	Names of the Collieries.	Age.	Married or Single.	Children.	Remarks.
Jan. 13	Michael Henry,	Miner,	Girard,	27	Married,		Fall of coal at face of breast.
13	Christ Bendor,	Miner,	Shenandoah,	30	Single,		Fall of coal, through his own neglect.
Feb. 12	James Collins,	Repairsman,	North Mahanoy,	55	Married,		Caught under gangway timber, that was knocked out by fall of slate.
18	John Perry,	Repairsman,	Lehigh, No. 3,	40	Married,	1	Fall of piece of bone coal, while engaged repairing gangway where a crush had taken place.
18	William James,	Miner,	Turkey Run,				Caught by piece of coal he was barring down.
Mar. 5	John O'Leary,	Laborer,	Lehigh, No. 3,				Caught in dirt elevators, shoveling in coal dirt. Shovel slipped in, and while endeavoring to pull it out, was caught by machinery.
10	Patrick Lawlor,	Miner,	West Lehigh,	50	Wife dead	2	Fall of coal, while opening chute.
18	Henry Argus,		St. Nicholas,				Fall of slate on gangway.
23	Peter Lubey,	Miner,	Girard,				Fell down manway in breast.
April 16	Frank Wright,	Door-boy,	Plank Ridge,	14			Fell under a car wheel riding on it. Had been warned by foreman day previous to desist from riding on cars; that if he left door he was attending, he would be discharged, which order he disobeyed, with fatal result.
19	William Beeker,	Laborer,	Cuyler,	21	Single,		A piece of coal, falling from pillar, struck him on top of head, causing death.
19	Edward McDonald,	Miner,	Conner,	24	Single,		Piece of roof fell from between two props, caused by their being two slips, and which could scarcely have been seen by deceased.
May 4	Peter Cleary,		Ellangowan,		Single,		In attempting to uncouple cars while passing around a curve, his head was caught, and jammed between them, inflicting such injury as to cause death on 7th inst.
7	James Boyle,	Miner,	Honey Brook, No. 1	45	Married,		Fall of coal in breast.
7	John Gallagher,	Miner,	Honey Brook, No. 1	25	Single,		
18	Wm. Henderson,	Driver,	Packer, No. 4,	16			Supposed to have been tramped to death by a mule. A breast closing in, caused the mule to turn suddenly around, passing the car to which he was hitched, and thus catching the driver, Henderson.
26	Thomas Burke,	Miner,	Packer, No. 4,	21	Single,		Fall of coal in breast, inflicting injuries from which death ensued following day.
June 7	John McDonough,	Miner,	Turkey Run,	26	Single,		Fall of top coal.
9	Harry Ryan,	Starter,	Bear Ridge, No. 1,	27	Single,		Rush of coal from battery knocked out center props, carrying deceased with it.
July 7	William Reese,	Miner,	Eureka,	46	Single,		Fall of coal.
July 13	Peter Donnelly,	Laborer,	Bear Ridge, No. 1,	70			Struck in abdomen by tail-board of dirt wagon, inflicting injuries causing death.
19	George Burchill,		Stanton,	20			Crushed between car and chute
27	John Reese,	Dis. Supt. P. & R. C. & I. Co.,	Kehley Run,		Married,	8	Suffocated by carbonic oxide gas in water level gangway, where they had gone during the night to make an examination.
	Jonathan Wasley,	Superintendent,	Kehley Run,		Married,	7	
	Frank Willman,	Inside boss,	Kehley Run,		Married,	3	
Aug. 9	James Evers,	Laborer,	Indian Ridge,	25	Single,		Fall of top coal in gangway.

REGISTER OF FATAL CASUALTIES—*Continued.*

Dates	Names of Persons fatally.	Occupation.	Names of the Collieries.	Age.	Married or Single.	Children.	Remarks.
Sept. 1	Simon Gregory,	Foreman,	Kehley Run,	45	Married,	. .	Suffocated by gas.
8	Andrew Server,	Laborer,	Packer, No. 4,	20	Single,		Fall of slate. Died from injuries on 27th.
9	John McGinley,	Miner,	Honey Brook, No. 4	35	Married,	5	Fall of top coal in breast.
9	John Rudloff,	Miner,	Primrose,	35	Single,	. .	Fall of coal. Engaged robbing back on turnout, he displaced collar, coal falling upon him.
16	John Mannell,	Miner,	Kohinoor,	56	Wife dead	*	Explosion of gas. Died from injuries on 24th.
17	John Hendricks,	Laborer,	Plank Ridge,	35	Married,	3	Shot in adjoining breast broke through pillar. Deceased was standing at buggy dump in breast.
18	John Dyer,	Driver,	Indian Ridge,	22	Married,	1	Crushed between wagons and side of gangway on trip from counter chute to top of plane.
20	Phillip Walters,	Miner,	Kohinoor,	25	Single,	. .	Fall of coal from five feet bench.
28	Joseph Sacklieskie,	Miner,	Kohinoor,	. .	. . . . . .	. .	Fall of coal in breast. Died on October 18, in hospital in Philadelphia from injuries.
Nov. 8	John Hugo,	Miner,	Knickerbocker,	33	Married,	5	Fired a shot, and returned to work, drilling a hole in pillar, without making any examination of execution of shot. Corner of pillar fell on him, causing injuries from which he died following day.
23	Thomas Jones,	Bottom-man,	Kehley Run,	24	Single,	. .	Coupling between wagons broke, letting empty wagon run down slope, catching him at bottom, breaking both limbs, and injuring body, from which he died on December 1.
Dec. 1	William Britt,	Miner,	Ellangowan,	31	Married,	3	Had completed robbing back a panel chute in West Primrose gangway, but, before leaving, tried to recover some tools that had been covered by a fall of top rock. In removing some loose coal from under fall, a piece of rock from top of loose mass fell, crushing him against top of chute, inflicting injuries from which he died on 5th instant.
7	Daniel Mull,	Miner,	Cuyler,	22	Single,	. .	Fall of coal. Fired two shots in top bench over gangway, which set top "working." It was then decided to leave the place until morning. While awaiting driver to come in, so as to ride out, the place settled off a little, when deceased took a drill, and struck the collar under the loose coal, to cause it to settle more rapidly, that they might be able to resume work in the morning. The stroke started the mass of coal, swinging out two sets of timbers, and covering all the men, killing Daniel, and slightly injuring John and Lewis Mull and Joseph Flaherty.

*Two sons in England.

REGISTER OF NON-FATAL CASUALTIES.

Date.	Names of Persons Injured.	Occupation.	Names of the Collieries.	Remarks.
Jan. 10	William Thomas,	Miner,	Ellangowan,	Premature explosion of shot; thigh mashed.
23	Ernst Frederick,	Platform man,	Ellangowan,	Fell down chute; ribs fractured.
28	James Marshall,	Slate picker,	Honey Brook, No. 4,	Fell off breaker; arm broke.
28	Charles Berger,	Miner,	Ellangowan,	Struck by piece of slate; side injured.
Feb. 3	Charles Maloy,	Driver,	Elmwood,	Fell under cars; arm broken and head cut.
3	Jacob Kester,	Carpenter,	Elmwood,	Jammed between railroad cars; hips injured.
11	Michael Coyne,	Driver on dirt bank,	Ellangowan,	Foot caught between rails; shoulder broken.
12	Michael Courtney,	Miner,	Glendon,	Explosion of gas; slightly burned.
12	John Hendricks,	Driver,	Thomas,	Hurt on dirt bank.
13	Ben Bouden,	Miner,	Ellangowan,	Struck by piece of slate; head and foot hurt.
14	Thomas Trevethan,	Miner,	Boston Run,	Starting battery; hurt about body.
18	Thomas Williams,	Fireman,	West Shenandoah,	Cylinder fell on foot.
Mch. 1	Daniel Ballety,	Miner,	Honey Brook, No. 1,	Fall of coal; back and hip injured.
9	Martin Clark,	Miner,	Turkey Run,	Fall of coal; injured severely.
9	John Radcliff,	Miner,	Suffolk,	Fall of coal; arm broke.
18	Oscar McCord,	Driver,	William Penn,	Jammed by mine cars.
18	Michael Campbell,	Miner,	Ellangowan,	Fall of coal; leg broke and back hurt.
23	John Judge,	Slate picker,	St. Nicholas,	Caught in machinery; rib broken, and otherwise injured.
April 10	John Maher,	Miner,	Turkey Run,	Struck by lump of coal; body injured.
10	William Harner,	Miner,	Mahanoy City,	Struck by lump of coal; side cut.
22	William Broderick,	Miner,	Ellangowan,	Caught between cars; hand hurt.
26	John Preston,	Driver,	Kohinoor,	Fall of coal; small bone of leg broke.
May 6	Noah Compson,	Miner,	St. Nicholas,	Burnt by powder.
6	Charles Dugan,	Miner,	St. Nicholas,	Burnt by powder.
7	Jacob Frank,	Laborer,	Turkey Run,	Burnt by powder.
7	George Ellis,	Miner,	Mahanoy City,	Explosion of gas; face and hands burned.
21	James Murphy,	Miner,	Boston Run,	Explosion of gas.
21	Thomas Hocking,	Miner,	Boston Run,	
26	John Brobst,		Knickerbocker,	Leg broken by dirt car on dirt bank.
June 7	John Hendrick,	Miner,	St. Nicholas,	Coal flying from shot; bruised about body.
10	Peter Canfield,	Miner,	Lawrence,	Explosion of gas.
10	Richard Jenkins,	Miner,	Lawrence,	
14	Patrick Giboney,	Miner,	North Mahanoy,	Fall of coal; head and leg injured.
22	Christ Hornicker,	Laborer,	Bear Run,	Hand burned by powder.
28	Edward Williams,	Driver,	Girard,	Explosion of gas.
29	Michael McGee,	Door boy,	Honey Brook, No. 4,	Run over by car; arm seriously mashed.
July 1	George Davis,	Miner,	West Shenandoah,	Fall of coal; foot and leg hurt.
7	Michael Gallagher,	Driver,	Honey Brook, No. 4,	Foot mashed by mine car.
19	Michael Gaughen,	Miner,	West Shenandoah,	Struck by piece of coal; shoulder put out of joint.
21	Gilbert Sherman,	Miner,	Bear Run,	Fall of coal; leg and back bruised.
Aug. 3	Reinhold Kurtz,	Miner,	North Mahanoy,	Fall of coal; back hurt.
9	George Parfet,	Miner,	North Mahanoy,	Jammed between cars.

REGISTER OF NON-FATAL CASUALTIES—CONTINUED.

Date.	Names of Persons Injured.	Occupation.	Names of the Collieries.	Remarks.
Aug. 16	Hartman Becker,	Miner,	North Mahanoy,	Head and hand cut by piece of coal.
16	Patrick Welsh,	Miner,	West Shenandoah,	Fall of coal; body injured.
16	Thomas Hodgson,	Laborer,	Stanton,	Caught by cars; leg broken.
16	Henry Thomas,	Miner,	Turkey Run,	Fall of coal; back hurt.
19	James Carlin,	Miner,	St. Nicholas,	Struck by piece of coal; head injured.
23	Conrad Flidge,	Laborer,	North Mahanoy,	Jammed between cars; ribs fractured.
31	Patrick Gunning,	Miner,	Shenandoah City,	Fall of coal; hurt about head.
Sept. 2	Robert Jones,	Engineer,	Shenandoah City,	Head injured between wagon and slope while assisting in putting wagon on track.
9	Jacob Denn,	Miner,	West Shenandoah,	Struck by coal from shot; back injured.
16	Richard Triselas,	Inside boss,	Kohinoor,	Explosion of gas.
16	John Hargreaves,	Fire boss,	Kohinoor,	
16	John Carns,	Miner,	Kohinoor,	
16	Dennis Howard,	Miner,	Kohinoor,	
17	Michael Curley,	Miner,	Plank Ridge,	Shot broke through pillar from adjoining breast; knee sprained and otherwise injured.
17	Frank McAndrew,	Miner,	Plank Ridge,	Shot broke through pillar from adjoining breast; injured slightly.
18	Martin Fahey,	Driver,	Plank Ridge,	Jammed between cars; head injured.
23	Thomas Coyne,	Miner,	Ellangowan,	Fall of coal; head and shoulders injured.
25	John Jones,	Miner,	Kohinoor,	Wagon ran over his foot, cutting off three toes.
28	John Stroze,	Miner,	Kohinoor,	Fall of coal in breast; slightly injured.
Oct. 7	Thomas Conners,	Miner,	Indian Ridge,	Fingers crushed between coal and top of wagon.
11	John Evans,	Top man,	St. Nicholas,	Dragged by empty wagon on top of slope; rib broke and body bruised.
12	Anthony Welsh,	Slate picker,	Ellangowan,	Clothing caught by shaft of buckwheat coal screen; head and back injured.
12	John Dinney,	Starter,	Boston Run,	Fell off cage coming up slope; head and body injured.
13	Patrick Hartman,	Miner,	Ellangowan,	Fall of coal; head and back injured.
13	John Lawlor,	Miner,	Indian Ridge,	Struck by piece of coal; leg broke.
19	Jerry Gorman,	Miner,	Conner,	Fall of coal; both legs broken.
19	Thomas Mansell,	Miner,	Lehigh, No. 3,	Coal rolling off lower side of gangway while loading wagon; body severely injured.
19	John Bryant,	Miner,	Girard,	Fall of coal in breast; head and shoulders injured.
20	Charles Schwartz,	Loader,	Plank Ridge,	Struck by mine car; leg and foot injured.
27	John Bzufchek,	Laborer,	Kohinoor,	Run over by empty wagons while walking up slope; body injured.
Nov. 3	Thomas Yarnell,	Door boy,	Ellangowan,	Fell between cars; leg broke.
8	John Snedden,	Driver,	Plank Ridge,	Wagon jumped the track, knocking out prop, causing a piece of slate to fall; arm badly injured.
9	Martin Brennan,	Miner,	Ellangowan,	Fall of rock; head and legs injured.
11	Charles Betear,	Miner,	Ellangowan,	Fall of top slate; breast hurt severely.
11	Llewellyn Griffeth,	Assistant engineer,	St. Nicholas,	Struck by collar; rib broke.
12	Robert Scholds,	Top man,	Ellangowan,	Caught by hook of pitch-chain on dirt plane; part of foot cut off.
15	Thomas Evans,	Miner,	Bear Ridge, No. 1,	Premature blast in manway; seveaely injured.
19	Alex. Garraway,	Miner,	Draper,	Fall of top in gangway while timbering; leg broke and back injured.

	19	James Lally,	Slate picker,	Girard,	Fell down breaker steps; four ribs broken.
	24	Thomas Ellwork,	Driver,	Stanton,	Fell under wagon between slope and breaker; body crushed.
	26	Peter Ditchan,	Driver,	Ellangowan,	Run over by dirt dumper; leg broke in two places.
Dec.	1	George Lambert,	Miner,	Turkey Run,	Caught between wagon and prop; arm broke.
	2	Patrick Gibbons,	Miner,	Indian Ridge,	Fall of coal; skull fractured.
	6	Francis Slevin,	Laborer,	Audenried,	Squeezed by mule against side of stable; shoulder blade broken.
	7	John Mull,	Miner,	Cuyler,	Fall of coal. Slightly injured; Daniel Mull was killed by the fall.
	7	Lewis Mull,	Miner,	Cuyler,	
	7	Joseph Flaherty,	Miner,	Cuyler,	
	13	John Muldoon,	Miner,	Ellangowan,	Fall of top coal; toe mashed and foot hurt.
	28	Robert Madara,	Miner,	Kohinoor,	Fall of top coal while robbing back turnout; leg cut off.

RECAPITULATION OF FATAL CASUALTIES.

Explosions of gas,	1
Suffocation by gas, (carbonic oxide,)	4
Explosions of powder and blasts,	1
Falls of coal, slate, &c.,	24
Mine cars,	5
Miscellaneous,	4
Total,	39

RECAPITULATION OF NON-FATAL CASUALTIES.

Explosions of gas,	11
Explosions of powder and blasts,	10
Falls of coal, slate, &c.,	36
Mine cars,	19
Railroad cars on surface,	4
Miscellaneous,	12
Total,	92

COMPARATIVE STATEMENT OF CASUALTIES, TONNAGE, AND EMPLOYEES FOR SIX YEARS, IN SECOND OR SHENANDOAH DIVISION OF MINING DISTRICT OF SCHUYLKILL.

Years.	Killed.	Injured.	Total.	Total number employés.	Number of employés to each casualty.	Total number tons of coal mined.	Number of tons of coal mined to each fatal casualty.	Number tons of coal mined to each non-fatal casualty.	Ratio tons of coal mined to casualties.	Number of tons of coal to each employé.
1875, ...	26	114	140	10,403	$74\frac{43}{140}$	2,562,345	98,551	22,476.14	18,302.09	247.09
1876, ...	27	48	75	10,218	$136\frac{18}{75}$	2,891,117	107,078	60,210.15	38,548.04	282.18
1877, ...	33	54	87	10,537	$121\frac{10}{87}$	3,805,467	115,317	70,471.12	43,741.00	361.03
1878, ...	26	89	115	10,255	$89\frac{20}{115}$	3,049,275	117,279.16	34,261.10	26,515.08	297.06
1879, ...	43	111	154	11,080	72	4,386,966	102,022.10	39,522.05	28,486.16	395.18
1880, ...	39	92	131	11,471	$87\frac{48}{100}$	3,753,785.14	96,250.18	40,802.00	28,654.17	327.04
Total, ...	194	508	702	. . . . .	. . . . .	20,448,958.15				
Average, . . .	$32\frac{1}{3}$	$84\frac{2}{3}$	117	10,661	$98\frac{88}{100}$	3,408,159.15	102,150.05	43,095.05	29,886.16	318.13

REPORT OF EMPLOYEES, COAL MINED, DAYS WORKED, &C., FOR YEAR ENDING DECEMBER 31, 1880.

COLLIERIES.	Operators.	Number miners.	Total employees.	Number kegs of powder used.	No. days worked by breaker.	Number persons killed.	Number persons injured.	Number tons of coal shipped.
Boston Run,	Philadelphia and Reading Railroad,	50	196	1,625	183¼	. . . .	4	67,956.03
Conner,	do. do.	131	282	2,875	188¼	1	1	107,995.09
Ellangowan,	do. do.	220	551	4,575	185⅛	2	17	187,261.18
Elmwood,	do. do.	. . . .	16	510	27¾	. . . .	2	7,690.06
Girard,	do. do.	51	242	700	195	2	3	81,894.13
Hammond,	do. do.	65	220	1,300	186	. . .	. . . .	70,649.19
Indian Ridge,	do. do.	178	485	2,960	190	2	3	118,338.11
Knickerbocker,	do. do.	71	251	2,570	182¾	1	1	100,323.05
Mahanoy City,	do. do.	101	288	2,155	193¼	. . . .	2	98,613.17
North Mahanoy,	do. do.	139	294	2,800	178	1	5	89,752.00
Plank Ridge,	do. do.	161	367	3,600	178	2	5	91,740.13
Schuylkill,	do. do.	2	16	210	55¼	. . . .	. . .	9,266.05
West Shenandoah,	do. do.	112	332	2,600	190¾	. . . .	5	111,042.11
Shenandoah City,	do. do.	96	225	1,295	155½	. . .	2	52,689.00
Bear Run,	do. do.	67	232	1,350	117¾	. . . .	2	30,277.16
Furnace,	do. do.	47	124	1,090	157¾	. . . .	. . . .	35,336.07
Gilberton,	do. do.	32	140	205	110	. . . .	. . . .	13,229.18
Girard Mammoth,	do. do.	36	102	250	4¼	. . . .	. . .	722.14
St. Nicholas,	do. do.	91	258	2,350	176¼	1	6	69,931.09
Turkey Run,	do. do.	144	325	2,440	186¾	2	5	88,289.10
Tunnel Ridge,	do. do.	33	106	142	46	. . . .	. . .	3,458.17
Bear Ridge, No. 1,	Myers, McCreary & Co.,	52	256	375	193	2	1	64,001.19
Bear Ridge, No. 2,	Myers, McCreary & Co.,	62	260	425	179¼	. . .	. . . .	64,549.03
Colorado, No. 1,	Philadelphia Coal Company,	77	351	1,281	122	. . . .	. . . .	71,530.14
Shenandoah, No. 2,	do. do.	72	380	1,732	185	1	. . . .	126,224.15
Lehigh, No. 3,	do. do.	67	335	1,852	187¼	2	1	79,661.18
Packer, No. 4,	do. do.	107	423	3,913	189¼	3	. . . .	178,713.07
Cambridge,	Cambridge Coal Company,	10	20	120	187	. . . .	. . . .	5,122.00
Cuyler,	Heaton Bros.,	146	381	4,802	212¼	2	3	147,152.00
Copley,	Lutz & Bowman,	110	190	1,330	167½	. . . .	. . . .	57,026.14
Draper,	Draper Coal Company,	59	257	1,418	208¼	. . . .	1	87,982.15
Glendon,	J. C. Hayden & Co.,	90	240	1,927	165⅛	. . . .	1	89,506.19
Honey Brook, No. 1,	E. B. Leisenring, general manager,	48	236	1,643	182	2	1	80,778.10
Honey Brook, No. 4,	do. do.	56	255	1,722	183	1	3	110,712.04
Honey Brook, No. 5,	do. do.	42	237	817	181⅛	. . . .	1	124,153.02
Kohinoor,	Richard Heckscher & Co.,	175	405	3,200	210	3	10	159,813.14
Lawrence,	Lawrence, Merkle & Co.,	54	286	1,075	208¾	. . .	2	95,381.10
Primrose,	Primrose Coal Company,	65	139	900	165	1	. . . .	41,786.06

Stanton,	Miller, Hoch & Co.,	15	200	402	195¾	1	2	62,803.10
Suffolk,	Suffolk Coal Company,	100	272	2,383	187⅛	. . . .	1	93,292.03
Staffordshire,	Ward, Jones & Oliver,	13	27	347	145	. .	. .	8,111.19
Kehley Run,	Thomas Coal Company,	76	401	2,200	168¾	5	1	80,832.02
William Penn,	William Penn Coal Company,	200	450	2,500	200	. . . .	1	174,000.00
West Lehigh,	Fisher, Hazzard & Co.,	66	220	1,190	12-¾	1	. . . .	40,269.19
Webster,	L. S. Baldwin,	16	54	429	155¾	. . . .	. . . .	15,167.04
Oakdale,	E. L. Powel,	9	19	130	134	. . . .	. . .	3,896.00
North Star,	Reynolds, Roberts & Co.,	25	55	700	204	. . . .	. . . .	15,413.15
Laurel Ridge,	John A. Dutter,	12	45	415	208⅛	. . .	. . .	19,583.00
Mammoth,	. . . . . .	. . . .	1	. . . . .	. . .	. . . .	. . . .	156.00
Eureka,	. . . . . .	4	12	. . .	150	1	. . . .	6,576.00
Hillside,	. . . . . .	10	24	120	. .	. . . .	. . . .	3,000.00
		3,661	11,471	77,910	*175⅛	39	92	3,543,663.04
Consumed and sold at colliery,	. . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . .	. . .	210,122.10
								3,753,785.14

*Average.

NAMES OF COLLIERIES IN OPERATION IN THE MINING DISTRICT OF SCHUYLKILL, SHENANDOAH, DIVISION, DURING THE YEAR ENDING DECEMBER 31, A. D. 1880.

Numbers and Names of the Collieries.	Location of Collieries.	Names of Operators.	Coal Produced.					
			1875.	1876.	1877.	1878.	1879.	1880.
Boston Run,	Boston Run,	Philadelphia and Reading C. and I. Co.,	39,084	53,151	68,598	6,000	73,489.16	67,956.03
Conner,	Girardville,	do. do.	...	...	103,639	83,000	133,472.13	107,995.09
Ellangowan,	Lanigan's,	do. do.	53,984	91,884	145,866	2,000	17,242.13	187,261.18
Elmwood,	Mahanoy City,	do. do.	25,740	41,211	65.260	56,000	78,333.16	7,690.06
Girard,	Girardsville,	do. do.	39,371	51,290	95,043	73,000	107,877.10	81,894.13
Hammond,	Girardsville,	do. do.	88,610	104,652	121,416	102,000	116,585.17	70,649.19
Indian Ridge,	Shenandoah,	do. do.	98,569	112,213	155,136	122,000	173,517.09	118,338.11
Knickerbocker,	Yatesville,	do. do.	64,543	113,985	133,123	105,000	174,665.10	100,223.05
Mahanoy City,	Mahanoy City,	do. do.	51,402	73,363	117,293	86,000	126,171.04	98,613.17
Mahanoy, North,	Mahanoy City,	do. do.	40,080	53,217	86,886	70,000	113,878.02	89,752.00
Plank Ridge,	Shenandoah,	do. do.	81,737	103,074	118,819	80,000	122,424.10	91,740.13
Schuylkill,	Mahanoy City,	do. do.	13,501	58,553	21,058	35,000	49,661.01	9,266.06
West Shenandoah,	Shenandoah,	do. do.	30,069	66,309	100,762	69,000	122,507.16	111,042.11
Shenandoah City,	Shenandoah,	do. do.	67,850	53,299	47,403	35,000	69,522.05	52,689.09
Bear Run,	St. Nicholas,	do. do.	57,411	61,651	82,409	57,674	63,014.08	30,277.16
Furnace,	Gilberton,	do. do.	62,421	14,296	4,458	15,000	40,821.07	35,336.07
Gilberton,	Gilberton,	do. do.	50,437	91,691	87,832	58,842	59,014.16	13,229.18
Girard Mammoth,	Raven Run,	do. do.	39,407	55,000	34,608	54,723	35,000.00	722.14
St. Nicholas,	St. Nicholas,	do. do.	47,338	55,876	92,483	63,134	78,602.02	69,931.09
Turkey Run,	Shenandoah,	do. do.	61,359	62,000	60,529	71,997	95,179.06	88,289.10
Tunnel Ridge,	Mahanoy City,	do. do.	56.901	44,132	30.340	38,851	61,933.09	3,458,17
Bear Ridge, No. 1,	Mahanoy Plane,	Myers & McCreary & Co.,	87,876	100,000	23,517	44,520	89,333.08	64,004.19
Bear Ridge, No. 2,	Mahanoy Plane,	Myers & McCreary & Co.,	...	...	84,976	51,144	30,036.18	64,549.03
Colorado, No. 1,	West Mahanoy twp.,	Philadelphia Coal Company,	46,803	63,871	85,955	62,181	85,297.03	71,530.14
Shenandoah, No. 2,	West Mahanoy twp.,	Philadelphia Coal Company,	63.995	118.118	88,830	84,411	144,138.01	126,224.15
Lehigh, No. 3,	West Mahanoy twp.,	Philadelphia Coal Company,	88,581	80,747	117.165	83,852	111,487.03	79,661.18
Packer, No. 4,	West Mahanoy twp.,	Philadelphia Coal Company,	...	...	101,860	118,677	248,341.18	178,713 07
Cambridge,	Shenandoah,	Cambridge Coal Company,	...	5,000	2,862	5,000	2,197.00	5,122.00
Cuyler,	Raven Run,	Heaton Bros.,	52,755	65,000	55,570	78,722	126,291.00	147,152.00
Copley,	Mahanoy City,	Lentz & Bowman,	66,856	48,111	28,211	46,374	42.068.08	57,026.14
Draper,	Gilberton,	Philadelphia and Reading C. and I. Co.,	57,042	45,000	108,341	55,813	108,000.00	87,982.15
Glendon,	Mahanoy City,	J. C. Haydon & Co.,	67,979	15,060	41,2[illegible]2	42,139	52,122.11	89,506.19
Honey Brook, No. 1,	Audenried,	Lehigh and Wilkesberry Coal Co.,	55,637	99,471	102,781	62,451	89,059.01	80,778.10
Honey Brook, No. 4,	Audenried,	Lehigh and Wilkesberry Coal Co.,	51,729	88,419	101.281	61,243	95,298.08	110,712.04
Honey Brook, No. 5,	Audenried,	Lehigh and Wilkesberry Coal Co.,	85,229	124,088	132,859	96.535	119,917.09	124,153.02
Kohinoor,	Shenandoah,	R. Heckshir & Co.,	95,638	90,000	162,027	110,898	161,814.19	159,813.14
Lawrence,	Gilberton,	Lawrence, Merkel & Co.,	67,417	85,000	99,517	70.578	102,000.00	95,381.10
Primrose,	Mahanoy City,	Primrose Coal Company,	54,776	57,350	50,573	41,447	38,660.01	41,786.06
Stanton,	Gilberton,	Miller, Hoch & Co.,	61,792	60,000	78,289	74,623	97,136.16	62,803.10
Suffolk,	St. Nicholas,	Suffolk Coal Company,	23,245	46,680	66,181	64,459	85,451.01	93,292.03
Staffordshire,	St. Nicholas,	Ward, James & Oliver,	...	7,458	8,265	9,000	13,417.06	8,111.19

Thomas, (Kebley Run,)	Shenandoah,	Thomas Coal Company,	66,467	94,862	68,905	100,358	151,266.11	80,832.02
William Penn,	West Mahanoy twp.,	William Penn Coal Company,	107,640	164,000	164,476	123,000	178,445.06	174,000.00
West Lehigh,	Mahanoy City,	Fisher, Hazard & Co.,	13,551	70,140	13,405	33,333	18,553.16	40,269.19
Webster,		L. S. Baldwin,	1,000	6,290	553		2,810.12	15,167.04
Oakdale,								3,896.00
Mammoth,								156.00
Roanoke,	Shenandoah,			4,000		5,000		
East Gilberton,	Gilberton,	Peter Malley & Co.,				4,000	5,000.00	
East Stanton,		John Dutter,				1,000	13,000.00	
North Star,	Mahanoy City,	Reynolds & Roberts,		8,111	1,504	7,000	11,493.11	15,413.15
Vulcan,	Mahanoy City,		26,266	38,216	6,356	16,565		
Morris,	Mahanoy City,	Parmley & Russel,	24,378	7,705	3,583	6,788	233.00	
Laurel Ridge,		John A. Dutter,						19,583.00
Hillside,								3,000.00
Eureka,								6,576.00
Total shipped to market,			2,562,345	2,740,117	3,590,064	2,841,774	4,138,706.17	3,543,663.04
Consumed or sold at colliery,				151,000	215,403	200,000	248,262.03	210,122.10
Gross total produced,			2,562,345	2,891,117	3,805,467	3,041,774	4,386,969.00	3,753,785.14

THIRD OR SHAMOKIN DISTRICT.

OFFICE OF INSPECTOR OF MINES, SHAMOKIN DISTRICT,
ASHLAND, *March 14, 1881.*

To His Excellency HENRY M. HOYT,
Governor of Pennsylvania :

DEAR SIR: -In compliance with an act of Assembly, entitled "an act providing for the health and safety of persons employed in and about coal mines," approved March 3, 1870, I herewith have the honor of submitting this, my annual report of proceedings, accidents, fatal and non-fatal, condition of workings with tabulated statements of employés, tonnage, etc., for the year 1880 :

The total quantity shipped to market,	3,285,216.15
The total consumed or sold at colliery,	176,155.03
The total production for year 1880,	3,461,371.18
Decrease from year 1879,	354,749 18
Number of miners,	4,162
Total number of employès,	11,616
Number of kegs of powder used,	59,590
Average number of days worked,	$174\frac{1}{2}$
Number of fatal casualties,	34
Number of non-fatal casualties,	124
Total,	158
Ratio of fatal accidents to number of miners employed,	$122\frac{1}{2}$
Ratio of fatal accidents to total number of employés,	$341\frac{3}{5}$
Ratio of non-fatal accidents of employés,	$93\frac{6}{10}$
Ratio of total accidents of employés,	$73\frac{1}{2}$
Ratio of powder to each miner,	$14\frac{8}{25}$
Ratio of fatal accidents to tons of coal produced,	101,805 01
Ratio of casualties to tons of coal produced,	21,907.08
Ratio of coal produced to each miner,	831.13

One hundred and ninety-one visits were made to collieries to examine their workings and attended to twenty-one inquests. Traveled in performance of those duties, by rail, 4,511 miles; on foot, outside, 713 miles; on foot, in mines, 525 miles. Total, 5,749 miles. In addition to tabulated statements of number of miners employed, number of kegs of powder used, and number of tons of coal produced, I have given my views on ventilation, accidents, their causes, and such other information as I considered of importance to those engaged in the mining of coal.

Respectfully, your obedient servant,

JAMES RYAN,
Inspector.

GENERAL IMPROVEMENTS.

ENTERPRISE.

Tunnel driven from No. 8 Twin vein south 38 yards to Skidmore vein; drift opened on Buck mountain vein; built one double breaker in place of one destroyed by fire, July 15th, 1880, and one office.

FRANKLIN COLLIERY.

Erected a new 14-foot fan to ventilate colliery.

PEERLESS COLLIERY.

Sunk a new slope 90 yards on the north dip of Red Ash vein on angle of 46½°, and have driven a tunnel north from Pink Ash 30 yards to Diamond vein.

CAMERON COLLIERY.

Sunk the No. 2 slope, a lift of 125 yards on angle of 40° from bottom of old lift, which makes a total depth of 250 yards on an angle of 40°; slope bottom cutting the No. 10 vein; drove a tunnel south 132 yards from No. 9.

LUKE FIDLER COLLIERY.

Sunk an inside slope from shaft level 113 yards on an angle of 18°.

SHORT MOUNTAIN AND LYKENS' VALLEY COLLIERY.

Erected a dirt plane outside near breaker.

PENNSYLVANIA COLLIERY.

Put up a new 14-foot fan to ventilate colliery; have put eight new boilers in place and built a saw-mill.

MOUNT CARMEL COLLIERY.

Erected a new breaker in place of one which was destroyed by fire sometime previous.

BIG MINE RUN COLLIERY.

Erected a new 16-foot fan to ventilate upper drift workings.

"LOGAN COLLIERY,"

Located at Centralia, Columbia county, Pa., on lands of the Locust Mountain Coal and Iron Company, operated by Lewis A. Riley & Co.

This is a new colliery opened during 1880. Two slopes, one a single and the other a double track, have been sunk on the north dip of the Centralia basin in the mammoth or "E" vein, from the outcrop to the bottom of the basin, 200 yards. The upper, or first, 100 yards on a pitch of 30°; the second on 15°.

The single track, or the No. 1 slope, is intended to work the coal on the upper level of the north dip. The double track, or No. 2 slope, is to work the coal on the lower lift of the north dip and both lifts of the south dip. Gangways are being driven east and west, two from No. 1 slope and four from No. 2 slope.

The mammoth vein is 26 feet thick, and coal of a superior quality.

The drainage at present is by means of a ten-inch Blake pump. A very large double duplex pump, made by Albright & Stroh of Mauch Chunk, is being put in. It has a capacity of 1,700 pallons per minute.

The ventilation is produced by a 16-foot fan, and is ample.

The outside improvements at this colliery are very large and of the best workmanship.

At No. 1 slope the hoisting engine is 20-inch cylinder, 4 feet stroke. The coal from this slope is landed and run to and from breaker on gravity roads, a distance of 200 feet.

At No. 2 slope a pair of direct acting hoisting engines have been built, 26-inch cylinder, 4 feet stroke, with an iron conical drum 14 feet long, 7 and 10 feet in diameter.

The coal from this slope is hoisted from the mouth of the slope over the center of the breaker, and the coal discharged direct from the wagon into the dump shute. Two cars can be hoisted at a time and 1,000 feet per minute.

The breaker has a front of 120 feet, and is 150 feet high from railroad to top of shieve house.

The capacity is estimated from 1,200 to 1,500 tons per day. The first coal was put through the breaker in January, 1881.

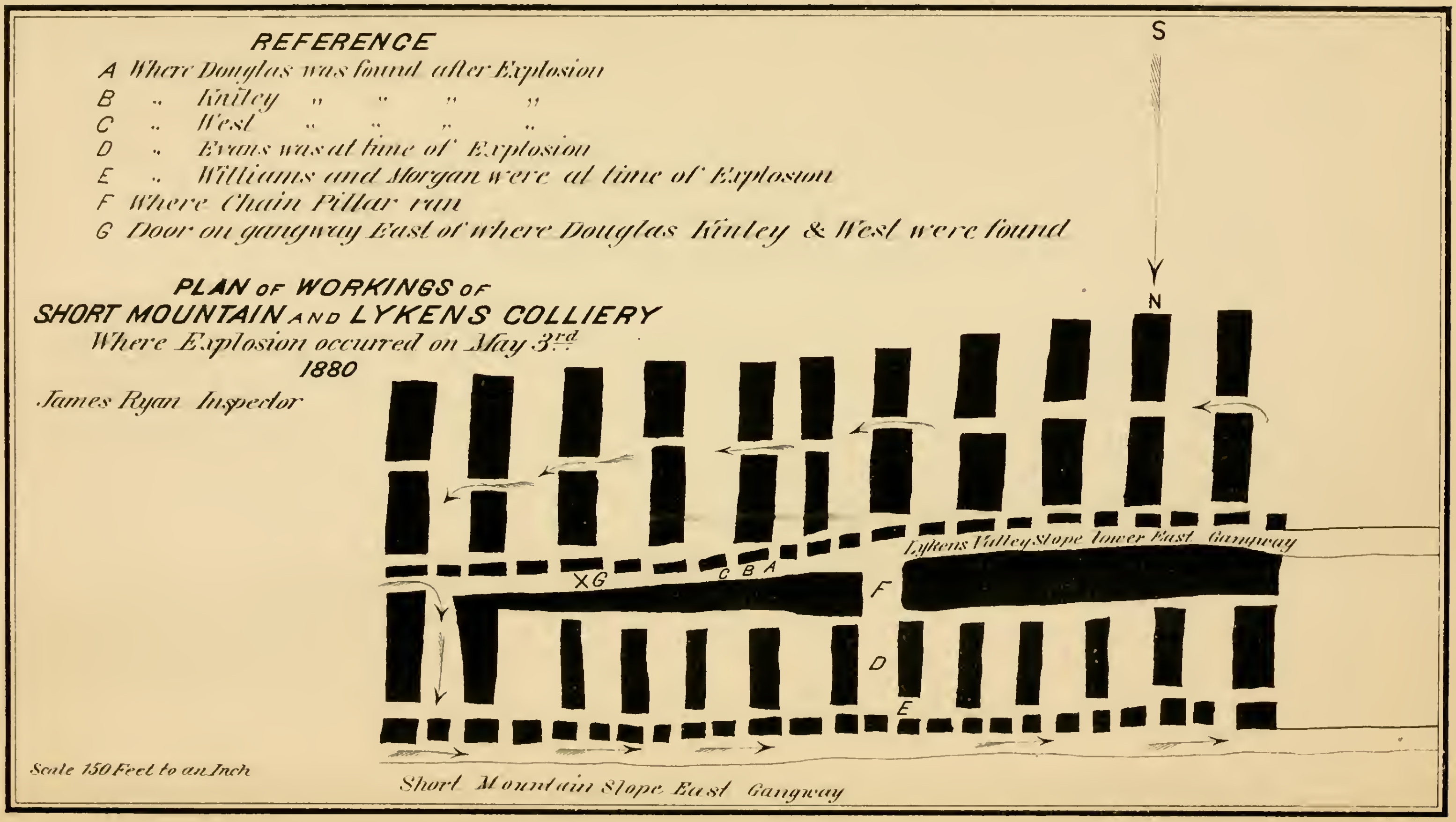
CENTRALIA COLLIERY,

Located at Centralia, Columbia county, Pennsylvania, on lands of the Locust Mountain Coal and Iron Company, operated by Lewis A. Riley & Co.

This is a new colliery, partially opened during 1880.

A double track slope has been sunk on the south dip of the Buck mountain vein, 512 feet from the surface to a point 330 feet below the old water level gangway; the dip on the upper level is 42°, in the lower, 50°. The vein is 15 feet thick, and the coal good, with a bright fracture. No gangways have yet been driven, but are now being turned east and west from the foot of the slope, the face of the old water level gangway is some 1,200 feet west of the slope. It is proposed to drive this west and work it as a counter gangway, with a dump schute into the lower lift gangway. The drainage at present is by means of hoisting water on the slope.

A 12-foot ventilating fan has been put up, but not yet connected with air-way.



REFERENCE

A Where Douglas was found after Explosion
B " Kinley " " " "
C " West " " " "
D " Evans was at time of Explosion
E " Williams and Morgan were at time of Explosion
F Where Chain Pillar run
G Door on gangway East of where Douglas Kinley & West were found

PLAN OF WORKINGS OF
SHORT MOUNTAIN AND LYKENS COLLIERY
Where Explosion occured on May 3rd
1880

James Ryan Inspector

Scale 150 Feet to an Inch

S
N
Lykens Valley Slope lower East Gangway
X G
C B A
F
D
E
Short Mountain Slope East Gangway

The breaker is to be built in the spring of 1881; a pair of hoisting engines, eighteen-inch cylinder, four feet stroke, have been erected, and eight boilers. No coal was shipped during 1880.

CARSON COLLIERY.

Put in a new set of elevators and one large screen.

MONTANA NO. 2.

Built a new breaker and put up a 10 foot fan to ventilate colliery. This is the colliery mentioned in my last year's report under the head of improvements, and called "Monroe."

GREENBACK.

Water has been pumped out of the old slope west of slope bottom; a tunnel has been driven north —— yards to the No. 9 Twin vein; work progressing; driving gangway eastward.

HICKORY RIDGE COLLIERY.

Built a small new breaker to take the place of one which was destroyed by fire on the night of November 4, 1878.

WILLIAMSTOWN COLLIERY.

Sunk two slopes, viz: One on Lykens Valley vein 204 yards deep on an angle varying from 28° to 40°; put in an Allison steam pump, cylinder 20″ diameter, 8″ pole for drainage of lift. Bear Valley slope sunk 125 yards on Mammoth vein on an angle of 60°; put in for drainage of slope an 8″ Blake pump, 16″ diameter steam cylinder.

IMPROVEMENTS IN VENTILATION.

It is a source of no little gratification to be enabled to report that the improvements in the ventilation of the mines in the district has received more attention during the past year than in any preceding year of my term of office, and that decided and satisfactory advances have been made in this respect in the condition of collieries. Although in this, as in other matters of reform or improvement, it is not as general as desired, and some few are delinquent, yet a radical change for the better has taken place.

There were fifteen fans erected during the year as follows:

One at Wadleigh slope, Philadelphia and Reading Coal and Iron Company, 12 feet in diameter.

One at Merriam, Philadelphia and Reading Coal and Iron Company, 18 feet in diameter.

One at Locust Spring, Philadelphia and Reading Coal and Iron Company, 15 feet in diameter.

One at Pennsylvania, Mineral Railroad and Mining Company, 14 feet in diameter.

One at Cameron, No. 2 slope, Mineral Railroad and Mining Company, 12 feet in diameter.

Two at Excelsior, Excelsior Coal Company, each 15 feet in diameter.

One at Williamstown, Summit Branch Coal Company, 18 feet in diameter.

One at Big Mine Run, J. Taylor, 16 feet in diameter.
One at Franklin, S. S. Bickel, 14 feet in diameter.
One at H. Clay Shaft, J. Langdon & Co., 14 feet in diameter.
One at Peerless, Cruikshank & Enis, 10 feet in diameter.
One at Logan, Reilly, Lilly & Lentz, 14 feet in diameter.
One at Montana, No. 2, A. H. Church, 10 feet in diameter.
One at Centralia, Lehigh Valley Coal Company, 12 feet in diameter.

There is now a total of forty-eight fans in the district, in a total of fifty-six collieries of all classes, nine of which are land sale or small collieries, where coal produced is sold for local consumption. The above number of fans furnish ventilation for thirty-eight collieries.

In a few collieries that do not generate fire damp, (C. H. gas,) the necessary appliances or means of circulating the air current to face of gangways, chutes, headings, or other working places are neglected, that is doors and brattice, or air pipes, and an insufficiency of cross-headings through pillars, thus causing powder and lamp smoke to accumulate and remain standing in those parts of the workings; that pure air cannot reach to dispel or render harmless to the health of those employed therein, owing to the absence, or rather neglect of these necessary means of conducting and circulating the air properly and that is positively required and directed in the seventh section of the ventilation act. This complaint exists principally in collieries where the vein is flat or of light pitch, the coal being loaded into wagons in the breasts or run down from face to gangway on sheet iron.

Promises have been made by operators and superintendents to have this speedily remedied and the necessary improvements made without having recourse to legal measures to compel compliance with the provisions of said seventh section of the ventilation act.

Deeming it preferable to secure the requisite improvements, and a general compliance with the requirements of the ventilation act, amicably and willingly on the part of those in charge or working the mine, and as being more effectively looked after than through legal means and of greater advantage to all concerned, I have refrained in the matter thus far from instituting any legal proceedings, and earnestly hope to be relieved of the necessity of doing so in the future.

With the few exceptions noted, the collieries of the district are generally well ventilated throughout all the working places, and in this connection desire to specially mention the following:

The Philadelphia and Reading Coal and Iron Company's collieries.
Logan and Centralia collieries, operated by Reilly, Lilly & Lentz.
Continental colliery, operated by Lehigh Valley Coal Company.
Williamstown colliery, operated by Summit Branch Coal Company.
And also a number operated by individuals too numerous to particularize.

The Williamstown colliery is particularly deserving of special notice. I have never yet seen a colliery as well ventilated, more especially the new slope sunk on the Lykens Valley vein.

Compressed air is conducted in pipes down the slope and circulated through and to face of all workings by branch pipes, supplying an ample quantity of pure air to the employés in every part of these workings.

In all my connection with mining I have never seen any supply of air equal, or so thoroughly distributed throughout the workings of the mine as is supplied in this mine by compressed air.

EXPLOSIONS OF GAS.

There were twenty explosions of carbureted hydrogen gas in this district during the year 1880, by which eight persons were fatally injured, and thirty six persons non-fatally, some being but very slightly burned.

This is an increase over that of 1879, of four fatal and twenty-one non-fatal injured, a total increase of twenty-five. This fruitful source of accidents in the mines, its causes, means of prevention, or plans by which their frequent recurrence might be reduced, has been so exhaustively treated in former annual reports by the several mine inspectors, that scarcely anything new can be said upon the subject.

It is not only an unpleasant, but painful task to recall the facts as gleaned in the examination of the several explosions, and to comment and adversely criticise the acts of those who have passed "to that bourne, &c," yet the duty we owe to the present and future workers in the mines compels us to it, however much it may harrow the feelings of the survivors.

The following extract of the remarks made in my report for 1879, under this head, is as applicable to the accidents of 1880, as it was then to those of 1879: "A large percentage of these accidents were clearly attributable to neglect of the most ordinary dictates of prudence, a very moderate degree of care could have prevented their occurrence."

The justness of this is all the more evident when it is shown that of the forty-four persons fatally and non-fatally injured, thirty-one of this number were the result of carelessness, neglect, and want of prudence, and could have been avoided.

The explosions of gas at Henry Clay shaft, on January 3, by which four men were burned. On May 3, by which three men were burned; and an additional explosion same day, by which two men were burned, one of whom subsequently died from his injuries; and again on November 4, when four men were burned, were all, without exception, the result of reckless carelessness and ignorance, both on the part of the workmen, and those having supervision of the colliery, as the following statements of the several explosions will fully attest:

That on January 3, was caused by two of the men going into a finished breast with naked lights, looking for loose coal to load a wagon, notwithstanding notice from fire boss had been given for none to enter any of the finished breasts, as they contained gas. On May 3, a driver coming in with a mule for loaded wagon, having come to a point in gangway, beyond which the use of naked lights were prohibited, and seeing men ahead with open lights, called to them if all was safe, to which they replied to him, "to come on," which he did; the men were eating their dinner, and while the driver was engaged hitching his mule to the wagon, the men started turning a fan to remove gas that had accumulated in a chute they were driving while they were at dinner; this brought the gas down into gangway, and in contact with naked lights, burning the three.

On same day, a miner having fired a shot, on his return to breast accompanied by "butty," found gas present, which they brushed out, and then started to drill a hole for a shot, having hung their open and safety lamps on a prop near face of breast, the safety lamp next to top slate and about two feet above the naked light, on completion of hole they commenced charging it, but when about half tamped the gas was fired by naked light, burning both the miners so seriously as to cause the death of one of them in eleven days after.

The explosion on November 10, was caused by a large quantity of gas that was freed or given off in consequence of fall of top rock, caused by six men who were robbing pillars in No. 8 vein, lower west gangway, the gas being carried by air current up to plane west gangway, where men were working with naked lights, igniting and burning four of them.

On May 3d an explosion occurred in Short Mountain slope, lower east gangway causing the death of five persons, two in Short Mountain slope workings by being burned and the other three in east gangway, lower level of Lykens Valley slope, by concussion of air.

This was the most disastrously fatal occurrence that has taken place in the district, and is directly attributable to the reckless system of mining pursued.

The two men who were burned were engaged skipping pillars.

The chain pillar that was between them and Lykens Valley slope workings—there being a cross-heading at face of breast in which they were employed—commenced to run, a result they should have looked forward to or been prepared for, as it had started to run some two weeks prior to this, and at that time the water from Lykens Valley slope workings came down into Short Mountain slope workings.

The run of chain pillar brought down the accumulated gas upon the exposed lights of these men, igniting it, and causing the explosion.

The concussion of air caused by the explosion of gas ignited by these two men in Short Mountain slope workings with naked lights, caused the death of the three others who were working in Lykens Valley slope above. (See accompanying sketch.)

The practice of skipping or robbing pillars under other workings where men are employed, or where drivers and workmen are passing to and fro is of such dangerous character, especially where the angle of dip is more than from 15° to 20°, that it cannot be too severely condemned, and when discovered or brought to our attention, we demand that every precaution be taken to prevent accident.

In this connection I quote from that part of the first section of the ventilation act which applies to robbing of pillars, viz: "When any level or *lift* thereof is being finished with a view and for the purpose of being abandoned, or when any of the pillars therein are to be removed, the owner or agent of such coal mine or colliery shall have the map or plan thereof furnished as hereinbefore provided, or such portions thereof as the case may require, carefully verified; *and notice shall be given to the inspector of the coal mines and collieries for the district, in writing, of the purpose to abandon or remove the pillars, as the case may be.*"

No pillars should be skipped or robbed, on a lower level, until the pillars of the level or levels above it are robbed out in advance of those in lower level, thus insuring safety to the workmen in upper levels. The explosion on July 7th at Peerless colliery was utterly inexcusable; the fire boss, in his morning examination of the mine, had found gas in breasts Nos. 18, 19, 20 and 21, and had marked, as is the usual custom, the date, with word "fire," on the chutes, battery door, and the plank in the manways between the batteries and first cross-headings from gangway, and as a further precaution, had requested a contractor to tell the workmen not to go up in these places without safety lamps until his return from his examination of other parts of the mine. Notwithstanding all these warnings, one of the workmen took a safety lamp and went up into breast 21, coming back on gangway and reporting it all right and then returning to it with naked light. A second workman took safety lamp to examine adjoining breast and in which he found gas above the heading; he then called to miner who had commenced working in breast 21, that there was gas at the heading and not to come through or he would be burned; not seeming to understand what was said, he put his head with naked light in towards heading, when the gas was fired, burning workman who was in breast and another who was at the battery in breast outside, going up into breast. Comment would be useless, as the facts plainly indicate the utter recklessness of these men.

The explosion at same colliery (Peerless) on November 4, by which three workmen were burned was attributable to the incompetency or neglect of the boss in charge in not having cross-headings driven through the pillars at the face of all finished breasts, thus preventing accumulation of standing gas in them.

Two of the men burned having gone from the breast in which they were working to an adjoining or finished breast, one of them went above upper cross-heading with naked light, firing the standing gas, the brattice from upper cross-heading to face of breast having been removed.

Again, on December 22, in same colliery, three men were burned through reckless carelessness combined with incompetency of those in charge. These men were placing props at head of finished breast to strengthen chain pillar; the props at bottom were placed against face of breast, and at top were about two feet from it down the pitch. Having placed the props, they commenced closing this space with slabs upon inside of props, the air current being thus prevented from circulating in this enclosed space, gas accumulated, and as one of the men in placing an additional slab inside the props thrust his head in with naked lamp, fired the gas. An occurrence that could well have been avoided by the exercise of a very limited amount of prudence and forethought, particularly in a place that largely generated gas. The explosion of gas in Cameron colliery on December 27, by which one man lost his life, occurred under the following circumstances: The deceased had gone to his breast to work without any examination having been made by the fire boss or his assistants, or even having taken the precaution of making an examination himself with a safety lamp; but went in with naked light, resulting in ignition and explosion of gas and infliction of such injuries as to cause his death two days later, a victim to that spirit of recklessness and contravention of the laws enacted for their safety that seems to govern the actions of very many of the workingmen and bosses in portions of this district, and which unfortunately in my examinations of the several accidents I was unable in any one case to secure such legal evidence as would justify an arrest and secure conviction of the guilty parties.

It would appear evident to all endowed by their Creator with common sense and competent to judge between right and wrong that the frequent deaths thus caused through carelessness or neglect would be sufficient to deter workmen from recklessly risking their lives and entailing all the hardships of an uncharitable world upon their impoverished families; and that it should not be necessary for the inspector of mines to resort to legal measures, or where necessary, that any difficulty should exist in securing the required legal evidence to convict those who endanger the lives or health of others by their illegal acts of omission and commission, and yet I regret to be compelled to state that this is the very greatest difficulty I have to contend with.

As in the many examinations I have made, and where I have made strenuous efforts to secure such evidence as would be admissible in court to convict the parties of their evident violation of the laws enacted for their security, yet, in every instance, have utterly failed in obtaining such testimony.

FALLS OF COAL, SLATE, ROOF, &c.

The fatal casualties resulting from above causes number for year fifteen, out of a total of thirty-four fatal occurrences, or forty-four per cent. The non-fatal casualties, from same causes, was thirty-four, out of a total of one hundred and twenty-four non-fatal casualties, or twenty-seven and a half per cent., being thirty-one per cent. of entire casualties. This is a decrease of ten fatal and an increase of fourteen non-fatal, or together a total increase of two in this class of casualties, over that of same class in 1879.

Of the fifteen fatal casualties, six were directly attributable to some one of the following causes, viz: Recklessness, negligence, or ignorance, and could, with ordinary prudence, have been avoided.

The safety of a breast or working place evidently, to a great extent, devolves upon the workman himself, and the care, attention, and prudence that he exercises.

Careful supervision on the part of those in charge of the mine is of the utmost importance, yet it does not relieve the miner from responsibility, nor the urgent necessity of constant watchfulness. Admitting that many of these casualties are unavoidable, the result of "slips," or being deceived in the "solid sound" of roof and sides, and which cannot be detected or at all times guarded against, yet a due regard to the proper, prompt, and efficient setting of timber, a vigilant and careful observation and examination of the working place, with at all times prudence in sounding or testing condition of roof and sides, would be an effective safeguard and tend materially to reduce the list of fatalities and maimed, arising from this prolific source. Although much has been written by the several inspectors during the past ten years on this class of accidents; bosses and workmen being advised with, and cautioned on each visit to collieries of the positive necessity of greater prudence and care being exercised, together with the too frequent examples of neglect, as shown in the annual casualty tables; yet it does not appear possible to deter some from rushing recklessly and inexcusably into the very jaws of death.

The loose discipline existing in very many of the mines is the true cause, in a great measure, for this sad condition, and more and more determines the urgent necessity of more effective measures than we now have, being secured through additional legislation.

As the mines are daily being increased in depth, and necessarily the danger to life and health of those employed in them increased in a greater ratio, the evident necessity of a higher order of intelligent and competent class of foremen than now generally employed, becomes at once apparent.

No part of the mines act of England has been so effective or been the means of accomplishing such vast improvement in the safety and health of mine-workers, as that requiring all managers, foremen, or overmen to pass an examination and receive certificates of competency from a board of examiners before being employed in these positions at any colliery in the kingdom.

This act has a code of general rules for the government of mines, which make the special rules adopted at each colliery, conforming to the general rules, have a legal status.

Fine, suspension, and imprisonment are the penalties attached for the violation of rules, and in case of overseers being the delinquent parties, the further penalty of cancellation of certificate. The inspector is clothed with power and required to proceed against any manager or foreman who unjustly prosecutes a workman under the rules, and he is further bound in the same penalties should he exceed or refuse to perform his duties in any manner, or proven to have made an unjust accusation.

Thus legal checks are enacted to prevent injustice either to workingmen, managers, foremen, or inspectors, or by either of them.

From the English reports of mine inspectors we learn that fines prove almost invariably to be ample punishment, the power of imprisonment being only resorted to in very rare cases where there has been willfulness; and in cases cited in these reports calling for the latter punishment, it was for not sufficiently spragging or staying the face of their working-places.

There can be no more positive proof advanced of the want of proper discipline in the mine than the number of killed and injured recorded annually under the head of falls, &c.

The recklessness frequently displayed is in a great measure accounted for by the great desire to send out the greatest amount of coal at the lowest possible cost, regardless of the safety of their working-place. It is not possible that legislation can prevent all accidents in mines, but there cannot at this day be any possible doubt of the great good that has been accomplished by our present ventilation act.

That it has elevated the standard of men who are given charge of mines, improved the machinery, means of ventilation, and general condition are facts beyond controversy. Yet this improvement has shown the weak points in the act, and the necessity of amendment in many important particulars, but in doing so, great care, prudence, and knowledge of what is required to benefit the working of mines is an indispensable necessity. It will not do to make it a political or partizan measure, nor yet a measure to add popularity to members who seek to be reëlected through favorable class legislation.

To draft an amended act that would benefit all connected with the mining of anthracite coal, a board of experts should be appointed for this purpose by the Legislature, to examine into and digest the necessary laws required for adequate protection of life and health of all employed in or about the mines. In the many accidents that occurred during the year, none show more conclusively the necessity of improvement in discipline than the two following:

On September 23, at Bast colliery, a miner was killed by a fall of top coal.

By the evidence adduced at inquest, the deceased had sounded the coal shortly before it fell, and found that it did not sound good, but concluded that there was no immediate danger, and resumed his work of raking coal into chute, from under it, with above result.

On November 22, at Excelsior colliery, a miner was killed by fall of top coal.

By the evidence in this case it appeared that deceased, with two others, had fired a shot in breast, and, on their return to face of breast, found the top coal cracking and working, the deceased having warned the others of the danger, commenced to bar down a bench of coal which was under the top coal. He was not engaged more than a minute or two, when about twenty to thirty tons of coal fell. One lump weighing about two tons falling on deceased.

MINE CARS AND MACHINERY.

Seven lives were lost through above causes during the year, or twenty per cent. of fatal casualties, as against ten lives lost from same causes for year 1879, being a decrease of three.

Eighten persons were injured during year as against thirty injured in 1879, or fourteen and one half per cent. of total injured, a decrease of twelve injured, or total decrease of fifteen, as compared with casualties of this class for preceding year.

Three of the above fatal casualties were the result of carelessness, and could have been avoided, thus adding cumulative evidence to the want of good discipline in many of our mines, and further showing the very great necessity of laws by which an improvement in this respect can be accomplished, attention to which has, to some extent, been set forth in preceding remarks in connection with falls of coal.

The door-boy killed at Bast colliery on February 6, according to evidence taken at inquest, was caused by jumping on wagons while in motion, to uncouple them, which was no part of his duty, and contrary to orders of mine and loader bosses.

This pernicious and reckless habit of jumping on and off cars while in motion has been the cause of a very large percentage of the deaths or serious injury of persons on surface roads, and no act in connection with accidents on railroads has been more severely censured and condemned both by the press and public than this.

Yet how very much greater the risk to life or permanent injury in committing the same act in the dimly lighted, contracted passages of the mine, where the danger is fully one hundred fold greater than on surface roads.

The casualty September 1st, in Big Mountain colliery, by which a driver was the victim, from the evidence elicited at inquest the cause of accident does not clearly appear.

A contractor having run down inside plane two loaded cars, heard moaning, and proceeded to where three loaded cars were standing with mules near by ready to be hitched to them, to haul them out, found the driver under the first wagon of the trip lying on his face, his limbs doubled back on body and life extinct; how he thus got under the car is involved in mystery.

On November 23, at Peerless colliery, a driver, aged seventeen years, was killed by being crushed between loaded mine wagon and timber on side of drift. He was coming out with loaded wagon, accompanied by two other young men, and when outside mouth of drift, being then ahead of wagon, he turned back, going towards approaching car, passing the young men who were with him, supposing, as they stated, to jump on front bumper of wagon.

On side of gangway on which he was caught there was only a space of about six inches between side of wagon and timber, there being on opposite side eighteen inches or more space.

The danger incident to jumping on or off moving cars is about equaled by drivers frequently jumping between cars, as in the case of death of driver at Luke Fidler colliery, who having hitched his mule to two loaded cars to haul out of mine, having started the mule, he became obstinate and refused to go further.

While the driver was urging him to go on, he turned round and started inwards on opposite side of cars to driver, the latter jumping between the two cars to drive him back, was caught and jammed by the front car to which the mule was hitched, coming back on one next to it.

MISCELLANEOUS.

Under this head there were four lives lost, twenty persons injured in the mines, and twelve persons on the surface, or of total fatal casualties, $11\frac{3}{4}$ per cent., and of non-fatal, 25.8 per cent., or together, 22.78 per cent. of total casualties. The loss of life and serious injury of above number of persons was almost all purely accidental. With an ever present and prudent care some of these accidents might possibly have been avoided, yet, when we examine the casualty tables and take into consideration the large number therein contained, the result of reckless carelessness, it is scarcely to be expected that that prudence which should always govern their movements will receive the attention that is necessary to reduce to any great amount this class of accidents.

MINERS' LAMP OIL.

The illuminating or lighting of mines is a subject that has absorbed the attention of very many efficient experts for a number of years, and much has been written in regard to the importance and necessity of an improved light.

The attention of dealers and manufacturers of illuminating oils, as also manufacturers of lamps, has been directed to the discovery of an agent or article that would answer the purpose.

Many kinds of coal and other oils and mixtures thereof have been experimented with and introduced, and as many various styles of lamps to burn them in, as there were kinds of oil, each guaranteed and represented by those interested in introducing them as a grand improvement on anything that had ever been used heretofore, safe, non-explosive, economical, (particularly the latter,) and sure to be all that was desired or could be attained.

Yet, notwithstanding all these representations and eloquent praise bestowed upon them, all the coal and patent oils that we have yet seen, used, or experimented with, have been objectionable or unfit for use in the mine, principally owing to the offensive odor or volume of smoke emitted by them, vitiating the air current to such an extent as to make its use prejudicial or very injurious to the health of those compelled to respire the air with which it had become mixed.

In some collieries we have met with such inferior qualities of oil, called by courtesy or for want of other or better name, fish oil, which, when used in miners' lamps, thickens and hardens the lamp wick, causing a crust to form on the end or burning part, the light from which, to use an explanation once heard, would require another light to see it. In order to overcome this defect, coal oil is mixed with it, which adds somewhat to its illuminating power, but adds much more to its emission of smoke as it also does to its unhealthiness. its effectiveness in producing smoke being about the same in proportion as adding fresh fuel to a bituminous coal burning locomotive.

We have also found in use in some collieries by loaders, drivers, spraggers, and door boys a villainous compound called lubricating, or black oil, which for the volume of smoke it is capable of producing, and unhealthy vitiation of air can scarcely be excelled, and for these purposes can be highly recommended. We have yet to see an oil that is superior or even equal in merit for miners' use, to that of pure whale oil or good cotton seed oil, that is, any which emit less smoke with equal illuminating power, and in same connection less deleterious effects on the air of the mine.

In the perfecting or discovery of an illuminating agent for mines, the requisites that must be attained is the increase of light, decrease of smoke and odor, and producing the least or minimum effect on the current of air. The oil or compound that shall contain these elements will attain the desired object.

The use of inferior oils in miners' lamps, or lamps of those engaged in the mine, is a violation of the true intent of the ventilation act, as set forth in the seventh section, as they add materially to the noxious and poisonous gases contained in the mine, and necessarily being inhaled by the workingmen, certainly requiring a much larger volume of air to dispel.

I have on several occasions, where these inferior noxious oils were in use, remonstrated against their continuance and demanded that a better article be made use of.

Whenever such testimony can be had as will justify the bringing of an action in court, I propose to test the legality of the use of these inferior and unhealthy oils for purposes of light in mines.

REGISTER OF FATAL CASUALTIES.

DATES.		Names of Persons Injured fatally.	Occupation.	Names of the Collieries.	Age.	Married or Single.	Children.	REMARKS.
Jan.	29	Michael Hines,	Miner,	North Ashland,	42	Married,	7	Starting coal that was blocked at head of chute in breast No. 17. It carried him into and down the chute about fifteen yards, killing him instantly.
Feb.	6	Patrick Dougherty,	Door-tender,	Bast,	17	. . . .	.	Struck his head against manway platform, and thrown under wagons.
	16	Michael Sheboskie,	Laborer,	Short Mountain,	60	Married,	2	Fall of top rock, while engaged timbering in gangway.
April	2	Peter Ditzler,	Laborer,	Cameron,	27	Married,	2	Fall of coal. Died from injuries following day.
	8	Christopher Conrad	Laborer,	Preston, No. 2,	20	Single,		Explosion of gas. Died from injuries on 23d instant.
	9	Henry Messner,	Miner,	Williamstown,	38	Married,	6	Fall of slate. Instantly killed.
	9	Emanuel Smith,	Miner,	Williamstown,	42	Married,	3	Fall of slate. Died from injuries on 13th.
	20	John Maroose,	Miner,	Burnside,	33	Married,	5	Coal flying from shot. A piece struck him on head, which accelerated his death, as at the time he was nervous and weak from lung disease.
	28	Henry H. Lentz,	Laborer,	Williamstown,	43	Married,	3	Fall of top slate in gangway.
May	3	George West,	Repairsman,	Lykens Val. slope,	65	Married,		Explosion of gas. Killed by concussion of air.
	3	Simon Kulley,	Asst. inside boss,	Lykens Val. slope,	31	Married,	6	Explosion of gas. Killed by concussion of air.
	3	Mich. C. Douglass,	Driver,	Lykens Val. slope,	20	Married,	1	Explosion of gas. Killed by concussion of air.
	3	Robert Williams,	Miner,	Lykens Val. slope,	53	Married,	1	Explosion of gas. Burned—died on 6th.
	3	Thomas H. Evans,	Miner,	Lykens Val. slope,	35	Married,	2	Explosion of gas. Burned—died on 9th.
	3	David Robinson,	Miner,	Henry Clay shaft,	49	Married,	6	Explosion of gas. Burned—died on 14th.
June	3	William Reynolds,	Miner,	Henry Clay shaft,	25	Single,	.	Fall of top slate.
	15	William H. Price,	Slate picker boss,	Hazel Dell,	44	Married,	6	Caught in breaker rolls.
	16	Richard McNamara	Miner,	Williamstown,	52	Married,	4	Fall of top rock. Died on 18th instant.
Aug.	20	Henry Volmer,	Miner,	Preston, No. 3,	39	Married,	1	Fall of top coal.
	25	Patrick H. White,	Miner,	Tunnel,	41	Married,	4	Fell into gunboat pit while taking out timber near bottom of slope. Died from injuries September 25th.
Sept.	1	William H. Wolfe,	Driver,	Big Mountain,	18	Single,	.	Run over by loaded mine wagon.
	9	John Shult,	Miner,	Mt. Carmel shaft,		. . . . .	.	Lifting a lump of coal into wagon, was injured internally, causing death on 19th.
	10	John Rash,	Miner,	Cameron,	39	Married,	4	Fall of top coal.
	13	John Higgens,	Laborer,	Lykens Valley,	19	Single,		Caught by lump of coal against coal battery. Died from injuries following day.
	23	William H. Evans,	Miner,	Bast,	38	Married,	4	Fall of top coal.
Oct.	28	Isaac E. Morris,	Miner,	Henry Clay shaft,	32	Single,		Fall of top slate.
Nov.	12	Mich. McNamara,	Miner,	Bast,	34	Married,	2	Fall of coal.
	15	Patrick Finnegan,	Driver,	Preston, No. 2,	21	Single,		Run over by loaded mine cars. Died following day.
	22	Samuel Brodinnus,	Miner,	Excelsior,	27	Single,		Fall of top coal. Went under top coal known at time to be unsafe, and killed through his own recklessness.
	23	Daniel E. Leibey,	Driver,	Peerless,	17	Single,	.	Caught between loaded mine cars and gangway timber at mouth of drift.
	26	Daniel Kennady,	Driver,	Luke Fidler,	15	Single,	. .	Caught between loaded mine cars, and crushed to death.
	26	Jonathan Lower,	Laborer,	Big Lick,	29	Married,		Fall of coal.
	6	Henry J. Kuhns,	Laborer,	West Brookside,	27	Single,		Fall of top slate.
	27	William H. Lott,	Miner,	Cameron,	34	Married,	2	Explosion of gas. Severely burned and blown down manway by force of explosion, inflicting such injuries as to cause death on 29th.

REGISTER OF NON-FATAL CASUALTIES.

Date.		Names of Persons Injured.	Occupation.	Name of the Collieries.	Remarks.
Jan.	3	Able Morris,	Miner,	Henry Clay, No. 1,	Explosion of gas; burned slightly.
	3	William Morris,	do.	do.	Explosion of gas; burned slightly.
	3	Thomas Deppa,	do.	do.	Explosion of gas; burned severely.
	3	John Split,	do.	do.	Explosion of gas; burned severely.
	7	Thomas Horan,	Loader,	Preston, No. 2,	Kicked by mule; knee injured.
	9	Daniel Zerbe,	Dump chute-man,	West Brookside,	Caught between dirt-dumpers; breast and side bruised.
	9	Thomas Myers,	Miner,	Preston, No. 2,	Explosion of gas; burned slightly.
	10	John Conry,	do.	Bast,	Fall of coal; leg broken, ankle dislocated.
	14	William Scully,	Laborer,	Preston, No. 1,	Hand caught between door and collar; first finger cut off, second finger mashed.
	20	Michael McNeary,	Miner,	Locust Spring,	Piece of slate fell on drill, which striking his hand cut it severely.
	21	John Murphy,	do.	North Franklin, No. 2,	Explosion of gas; face slightly burned.
	23	Edward McHugh,	Stable boss,	Locust Spring,	Kicked by mule in stomach.
	29	John Wagner,	Miner,	Big Mine Run,	Fall of coal; leg broken.
Feb.	16	Thomas Martin,	Laborer,	West Brookside,	Fall of coal; leg broken.
	16	Ferdinand Rinehart,	Miner,	Big Mountain,	Fell down an air-hole; shoulder and ankle dislocated.
Mar.	5	John Cummings,	Laborer,	Bast,	Finger caught between mine buggy and collar, and cut off.
	8	David Muir,	Driver,	Henry Clay drift,	Caught between mule and mine wagon; jaw-bone broken and face badly bruised.
	19	James Hoskins,	Slate-picker,	Williamstown,	Fell from breaker roof to railroad at noon-time; leg broken.
	19	James McIntyre,	Gangway laborer,	Bast,	Fall of coal; collar-bone broken.
	22	William O. Saltzer,	Laborer,	West Brookside,	Fall of slate; leg broken and head cut.
	24	George Horsewood,	do.	Preston, No. 3,	Finger cut off, by being caught on a collar while timbering.
	30	Evan Williams,	do.	Pennsylvania,	Fall of coal in gangway; leg broken.
April	7	Sebastian Kohl,	Oiler and spragger,	Burnside,	Hand caught between chain and side hook of wagon; tops of fingers cut off.
	8	Patrick Jefferson,	Miner,	Preston, No. 2,	Explosion of gas; face and hands burned.
	8	William Flynn,	do.	do.	Explosion of gas; nose and forehead burned.
	8	Thomas Myers,	do.	do.	Explosion of gas; face and hands burned.
	8	William Cranage,	do.	do.	Explosion of gas; ear burned, face badly cut.
	13	Mark Durkin,	do.	Big Mine Run,	Fall of coal; seriously injured.
	15	Frederick Killinan,	Laborer,	Merriam,	Explosion of gas; neck and hands slightly burned.
	19	Charles Frank,	Driver,	Reliance,	Spreader fell on wrist, dislocating it.
	20	Alfred Deer,	do.	Sterling,	Run over by loaded rock wagon outside; leg broken.
	22	Henry Damu,	Miner,	Merriam,	Fall of petition rock, while barring coal after blast; head and back injured.
	26	George A. Wolf,	Laborer,	West Brookside,	Caught between buggy and top rock; arm broken.
	27	Michael Gerrity,	Miner,	North Ashland,	Preparing cartridge for shot; spark from lamp ignited it, burning face and hands.
May	3	Joseph Parry,	do.	Continental,	Rush of coal while starting chute; leg broken.
	3	Thomas Thomas,	do.	Henry Clay shaft,	Explosion of gas.
	5	William Harper,	do.	do.	Explosion of gas.
	5	Robert Harper,	do.	do.	Explosion of gas.
	5	Jerome Reed,	Driver,	do.	Explosion of gas.
	11	Robert Phillips,	Timber-man,	Preston, No. 3,	Foot cut by an axe.
	12	August Shaffer,	Miner,	Monitor,	Fall of coal; hip dislocated.
	17	John E. Brennan,	Laborer,	North Ashland,	Fingers caught in cog-wheels of small fan, and severely mashed.
June	3	Charles Tyler,	Miner,	Keystone,	Finger mashed between clevis and socket of slope rope.

NON-FATAL CASUALTIES—*Continued.*

DATE.		Names of Persons Injured.	Occupation.	Name of the Collieries.	REMARKS.
June	16	James Touhey,	Laborer,	Tunnel,	Explosion of gas; slightly burned.
	21	Daniel Cooley,	Miner,	Henry Clay shaft,	Finger cut off, by piece of coal sliding along drill while barring coal.
	23	Nicholas Dedge,	Starter,	Merriam,	Starting battery; piece of coal struck his foot, breaking a bone.
	28	Frank York,	Miner,	Reliance,	Fall of coal; jaw-bone broken.
July	6	Daniel Kissenger,	Inside boss,	North Franklin, No. 2,	Explosion of gas.
	6	William Derr,	Loader,	Merriam,	Explosion of gas; slightly burned.
	7	Thomas Egan,	Miner,	Potts,	Fall of coal; shoulders, arm, and side bruised.
	7	Nicholas Brokenshire,	do.	Peerless,	Explosion of gas; hands, face, and neck burned.
	7	Edward McDonald,	do.	do.	Explosion of gas; hands, face, and neck burned.
	8	William Hughes,	Laborer,	Carson,	Fall of top (fire-clay); leg broken.
	14	John Stryker.	Miner,	do.	Fall of top slate; body bruised.
	19	Jesse Wentzel,	Top-man,	Tunnel,	Attempting to jump off rock wagons, was caught between them and badly squeezed.
	19	Patrick Duffy,	Timber-man,	Mt. Carmel shaft,	Piece of timber fell upon him; collar-bone broken.
	21	John Naughton,	Miner,	Preston, No. 3,	Fall of coal; back and ankle injured.
	30	Thomas F. Jones,	do.	Tunnel,	Fall of large timber leg; fingers mashed.
	28	Daniel Paul.	do.	Franklin,	Making a wedge; cut off finger with ax.
Aug.	2	Robert Badham,	do.	Preston, No. 3,	Explosion of gas; face, hands, and breast burned.
	2	Thomas Casey,	Laborer,	do.	Explosion of gas; face, hands, and breast burned.
	4	Jesse Rubright,	Bottom-man,	Merriam.	Timber truck run over foot; toe mashed.
	8	John Henry,	Outside driver,	Buck Ridge,	On way to coal plane bell rise to ring bell he fell, breaking arm above the wrist.
	10	Bernard Fallen,	Miner,	Bast,	Struck by piece of coal in the eye.
	10	John Haffey,	Starter,	North Ashland,	Fall of piece of coal; head and body cut and bruised.
	11	Henry Jones,	Fire-boss,	Preston, No. 3,	Caught between timber and wagons; hips injured.
	23	Jacob Umlauf, Jr.,	Miner,	Merriam,	Explosion of gas; face slightly burned.
	23	John Stricklen,	do.	Lancaster,	Explosion prematurely of blast, while tamping; burned and otherwise injured.
	23	Frank Persing,	do.	do.	
	24	Frederick Zuizon,	do.	Monitor,	Fall of coal; collar-bone broken.
	30	Isaac Reese,	do.	Henry Clay shaft,	Piece of coal slipped from face of breast; rib broken.
Sept.	20	Caleb George,	do.	Short Mountain,	Premature explosions of blast; face and arm burned; will lose sight of one eye, possibly both.
	20	James Roach,	Laborer,	Preston, No. 3,	Fingers cut off while making wedge.
	21	George Ormes, Jr.,	Miner,	North Franklin, No. 2,	Fall of coal; back injured.
	22	Thomas McGrath,	do.	Bast,	Struck by piece of coal; ribs fractured.
	23	William McKinney,	Driver,	Big Mountain,	Fell off loaded wagons while running down inside plane; arm broken and head cut.
	27	Martin Dropeskie,	Miner,	Reliance,	Fall of coal; head cut; body injured.
	29	John Donahoe,	Starter,	Bast,	Wagon on which he was riding in pump slope got off the track; fingers mashed; body bruised.
	30	Owen Conrey,	Miner,	do.	Fall of piece of coal; hand cut.
Oct.	7	John Mohan,	do.	Locust Spring,	Fall of top coal; body and head bruised.
	9	C. B. Zimmerman,	do.	Mt. Carmel shaft,	Fell down a hole; shoulder blade and three ribs broken.
	11	Louis Kurtz,	Bottom-man,	Monitor,	Lump of coal fell from wagon ascending slope, which rolling back struck his leg, breaking it.
	12	Andrew Zen,	Miner,	Mt. Carmel,	Fall of coal; leg broken.

	13	Jacob Schultz,	do.	Monitor,	Fall of coal; shoulder dislocated.
	13	Albert Schroeder,	Contractor,	North Franklin, No. 2,	Rock wagon run over his leg.
	13	George L. Kramer,	Driver,	do. do.	Caught between cars; knee fractured.
	13	Henry Picker,	Miner,	Potts,	Fall of coal; wrist cut.
	16	Thoman Rooney,	do.	Coal Ridge, No. 2,	Setting timber in slope was thrown down ten or twelve yards: head and neck injured.
	20	Patrick Collier,	do.	Wadleigh slope,	Fell down an air hole; ribs broken.
	20	Timothy Brennan,	do.	Stuartsville,	Fall of top coal; cut about head and leg broken.
	21	Patrick McGovern,	Bottom-man,	do.	Clevis in chain broke while wagon was being dumped into chute at breaker; McGovern had hip injured and body bruised; Coyle had leg broken.
	21	Patrick Coyle,	Driver,	do.	
	25	Christopher Robertson,	Door-tender,	Luke Fidler,	Riding on mine cars; fell under them; jaw bone broken.
	25	James Condron,	Miner,	Cameron,	Explosion of gas; face, neck, and hands burned.
	29	James A. Harris,	do.	Greenback,	Fall of top coal; hip dislocated.
	30	Peter Joyce,	Watchman,	Bast,	Passing through breaker; fell down a chute; ribs broken.
	30	John Maspluskie,	Miner,	Big Mountain,	Fall of coal: body injured.
Nov.	1	William Eddy,	Laborer,	do.	Caught between mine car and carpenter shop; body injured.
	4	John Clinger,	Miner,	do.	Fall of slate; head and body injured.
	4	John Schinbenz,	do.	Peerless,	Explosion of gas; hands and face burned.
	4	William Powell,	do.	do.	Explosion of gas; hands and face burned.
	4	Charles Thompson,	do.	do.	Explosion of gas; hands and face burned.
	4	William Eagan	do.	do.	Explosion of gas; hands and face burned.
	5	John McLoughlin,	Loader,	Preston, No. 3,	Struck by piece of coal on thigh, breaking it.
	10	Able Morris,	Miner,	Henry Clay shaft,	Explosion of gas.
	10	William Perry,	do.	do.	Explosion of gas.
	10	Anthony Faust,	do.	do.	Explosion of gas.
	10	Mar Kifkie,	do.	do.	Explosion of gas.
	12	Bernard Cannon,	do.	Locust Spring,	Fall of coal: head cut and otherwise injured.
	19	Aaron Rasbatch,	do.	Short Mountain,	Fall of coal; leg broken.
	19	Adam Rudisell,	Laborer,	do.	Caught between top rock and mine wagon; hip dislocated and back bruised.
	23	James Brower,	do.	West Brookside,	Finger cut off; caught between sprag and piece of slate.
	26	E. C. Hanna,	Superintendent,	Short Mountain,	Caught between railroad cars and trestling of slate chute at breaker; shoulder bone broken and otherwise injured.
	30	William Horan,	Miner,	Preston, No. 2,	Fall of slate; leg broken.
Dec.	6	John Clark,	do.	Monitor,	Explosion of gas; face, neck, and hands burned.
	8	George Shively,	Car oil,	Short Mountain,	Loaded mine car ran over his leg.
	9	David Thomas,	Locomotive conductor,	Bear Valley,	Fell under loaded mine cars; arm broken, head cut.
	13	Samuel Fesig,	Bottom-man,	West Brookside,	Ruptured by lifting timber.
	21	William J. Long,	Fireman,	do.	Plug came out of flue; face and hands scalded.
	22	John Carney,	Miner,	Peerless,	Explosion of gas; face, neck, and hands burned.
	22	John Owens,	do.	do.	Explosion of gas; face, neck, and hands burned.
	22	Michael Corcoran,	do.	do.	Explosion of gas; face, neck, and hands burned.
	24	Michael O'Neill,	do.	Locust Gap,	Struck by coal from blast; head and shoulder injured.
	28	Jacob Dietz,	do.	Merriam,	Fall of coal; collar bone broken.

RECAPITULATION OF FATAL CASUALTIES.

Explosions of gas,	8	23.53	per cent.
Falls of coal, &c.,	15	44.12	"
Mine cars and machinery,	7	20.60	"
Miscellaneous,	4	11.75	"
Total,	34	100.00	"

RECAPITULATION OF NON-FATAL CASUALTIES.

Explosions of gas,	36	29.0	per cent.
Explosions of powder and blasts,	4	3.2	"
Falls of coal &c.,	34	27.4	"
Mine cars and machinery,	18	14.5	"
Miscellaneous under ground,	20	16.2	"
Miscellaneous above ground,	12	9.7	"
Total,	124	100.0	"

COMPARATIVE STATEMENT OF CASUALTIES, TONNAGE, AND EMPLOYEES FOR SIX YEARS, IN THIRD OR SHAMOKIN DIVISION OF MINING DISTRICT OF SCHUYLKILL.

Years.	Killed.	Injured.	Total.	Total number employés.	Number of employés to each casualty.	Total number tons of coal mined.	Number of tons of coal mined to each fatal casualty.	Number tons of coal mined to each non-fatal casualty.	Ratio tons of coal mined to casualties.	Number of tons of coal to each employé.
1875, ...	38	106	144	9,585	66.5	3,348,726	88,124	31,591.15	23,225	349.07
1876, ...	37	61	98	10,652	108.6	3,208,306	86,711	52,595.03	32,737.16	301.03
1877, ...	28	66	94	10,857	115.5	3,471,562	123,984	52,599.07	36,931.10	319.15
1878, ...	47	128	175	11,106	63.4	3,070,218.14	65,323.16	23,986.10	17,544.02	276.09
1879, ...	46	103	149	11,094	74.6	3,816,122.16	82,959.04	37,049.14	25,611.11	343.19
1880, ...	34	124	158	11,616	73.5	3,461,371.18	101,805.01	27,914.06	21,907.08	211.18
Total, ...	230	588	818	. . . . .	. . . . .	20,376,307.08				
Average, . . .	38⅓	98	136⅓	10,818⅓	83.7	3,396,051.04	91,484.10	37,622.16	26,326.04	300.08

REPORT OF EMPLOYEES, COAL MINED, DAYS WORKED, &C., FOR YEAR ENDING DECEMBER 31, 1880.

COLLIERIES.	OPERATORS.	Number miners.	Total employees.	Number kegs of powder used.	No. days worked by breaker.	Number persons killed.	Number persons injured.	Number tons of coal shipped.
Mt. Carmel Shaft,	Philadelphia and Reading Coal and Iron Company,	212	501	3,800	177¾	1	3	142,999.12
Bast,	do. do.	105	314	1,410	193½	3	8	102,089.13
West Brookside,	do. do.	349	718	4,800	182½	1	7	308,616.04
Bear Valley,	do. do.	102	231	1,235	169½	....	1	53,300.07
Burnside,	do. do.	88	218	850	165	1	1	45,759.09
George Fales',	do. do.	34	79	165	10½	....	....	1,677.00
Helfenstein,	do. do.	.....	2	....	.....	....	....	18.10
Keystone,	do. do.	27	71	70	2[illegible]¼	....	1	2,730.10
Merriam,	do. do.	127	375	1,950	183¾	....	8	83,098.13
Potts,	do. do.	68	285	935	166¾	..	2	77,623.03
North Ashland,	do. do.	68	291	1,975	175½	1	3	99,048.15
Preston, Nos. 1 and 2,	do. do.	87	297	725	114¾	2	8	41,437.07
Preston, No. 3,	do. do.	61	266	740	196¾	1	8	79,356.16
Tunnel.	do. do.	75	115	115	.....	1	3	7.10
North Franklin, No. 2,	do. do.	160	327	1,400	160	...	5	63,180.05
Reliance,	do. do.	148	341	2,850	156	....	3	81,634.07
Locust Spring,	do. do.	116	300	1,950	191	...	5	94,143.07
Big Mountain,	Patterson, Llewellyn & Co.,	150	450	3,000	2[illegible]9	1	5	137,442.11
Excelsior,	C. W. Kingsley & Co.,	122	231	2,620	208½	1	....	104,3[illegible]8.09
Enterprise,	Thomas Baumgarten & Co.,	80	231	1,737	169¼	....	....	79,017.08
Locust Gap,	Graeber, Shepp & Co.,	70	260	2,500	209¼	..	1	92,401.18
Henry Clay,	J. Langdon & Co.,	150	329	2,448	231	3	15	109,691.03
Peerless,	John Cruikshank,	71	133	1,047	191	1	9	29,231.11
Sterling,	Kendrick & Fulton,	108	239	1,858	198	....	1	80,930.15
Royal Oak,	Tillet & Son,	6	11	80	260	....	...	2,197.01
Ben Franklin,	Baumgarden & Co.,	56	130	465	198	....	1	38,411.16
Monitor,	George W. Johns & Bro.,	125	358	2,5[illegible]6	199	....	5	119,942.13
Cameron,	M. R. R. & Mining Company,	191	500	4,032	249¼	3	1	160,853.13
Luke Fidler,	do.	163	360	2,634	23[illegible]¼	1	1	118,643.03
Pennsylvania.	do.	130	352	2,746	256¾	.	1	105,882.13
Short Mountain,	Short Mountain and Lykens Valley Coal Company,	209	821	2,485	229¾	8	5	171,417.05
Williamstown,	Summit Branch Coal Company,	186	595	2,469½	213	4	1	227,169.06
Lancaster,	Smith & Keyser,	25	51	421	147½	...	2	14,883.14
Black Diamond,	William Schwenek & Co.,	24	57	611	209	....	....	26,125.15
Hazel Dell,	Lehigh Valley Coal Company,	25	100	950	177	1	....	22,302.00
Continental,	do.	40	251	1,800	151½	...	1	79,598.00
Mt. Carmel,	Robertson, Montelius & Co.,	110	300	1,200	109	....	3	53,000.00
Big Mine Run,	J. Taylor & Co.,	141	381	3,592	194¼	....	2	111,683.12

Buck Ridge,	May, Andenried, & Co.,	80	208	1,017	215	....	1	53,768.05
Big Run Gap,	James Fennel,	6	18	75	290	....	....	2,568.00
Glen City,	J. A. Losee,	23	84	252	87	....	....	11,128.18
Carson,	Philip Goodwill,	30	75	510	180	....	2	11,460.02
Big Mountain, No. 2,	Northumberland Coal Company,	1	3	5	70	....	....	200.00
Franklin, No. 2,	S. S. Bickel,	15	68	26	18	....	....	2,966.00
Greenback,	Gorman & Tondy,	48	160	560	166	....	1	25,885.03
Rausch Gap,	William H. Yohee,	1	5	29	.....	....	....	896.17
Montana, No. 2,	A. H. Church,	37	103	780	107	....	....	11,276.19
Pioneer,	D. Vaughan & Co.,	3	11	113	180	....	....	2,373.00
Ashland tract,	A. Bancroft,	3	7	.....	.....	....	....	24.10
No name,	Samuel Myers,	1	2	.....	.....	....	....	70.00
Bear City,	Frank Martz,	1	4	16	200	....	....	413.00
Montana, No. 1,	Daniel Beaver,	1	3	5	125	....	....	330.07
		4,162	11,616	69,689½	*174½	34	124	3,285,216.15
Consumed or sold at colliery,	.....	....	....	....	....	....	....	176,155.03
Total production,	.....	....	....	....	....	....	....	3,461,371.18

*Average.

NAMES OF COLLIERIES IN OPERATION IN THE MINING DISTRICT OF SCHUYLKILL, SHAMOKIN DIVISION, DURING THE YEAR ENDING DECEMBER 31, A. D. 1880.

Numbers and Names of the Collieries.	Location of Collieries.	Names of Operators.	Coal Produced.					
			1875.	1876.	1877.	1878.	1879.	1880.
Mt. Carmel shaft,	Aalaska Station, North'd co.,	Phila. and Reading C. and I. Co.,		71,384.07	148,305.10	121,267.07	180,934.16	142,999.12
Bast,	Big Mine Run, Schuylkill co.,	do. do.		82,641.14	118,911.09	86,462.11	141,435.17	102,089.13
West Brookside,	Tower City, Schuylkill county,	do. do.		172,651.15	369,573.07	282,264.00	410,815.09	308,616.04
Bear Valley,	Shamokin,	do. do.		55,007.06	55,632.07	75,719.04	93,417.02	53,300.07
Burnside,	Carbon Run, Northumber'd co.,	do. do.		61,500.00	69,637.15	2,685.10	56,462.01	45,759.09
George Fales,	Shamokin,	do. do.		15,189.15	4,000.00	5,803,17	3,951.08	1,677.00
Helfensteine,	Helfensteine,	do. do.		16,308.07	37,366.09	11.00	6.10	18.10
Keystone,	Locust Dale.	do. do.		32,001.06	80,000.00	56,720.16	27,604.09	2,730.10
Merriam,	Locust Summit,	do. do.		115,326.11	136,073.10	85,500.14	64,315.19	83,098.13
Potts,	Locust Dale,	do. do.		39,067.05	103,806.15	81,515.14	88,493.04	77,623.03
North Ashland,	Dark Corner, Columbia co.,	do. do.			11,460.13	71,375.15	128,118.11	99,048.15
Preston, Nos. 1 and 2,	Girardsville,	do. do.		17,525.09	27,718.02	80,584.18	93,544.12	41,437.07
Preston, No. 3,	do.	do. do.		32,217.02	98,394.03	38,600.10	91,278.12	79,356.16
Tunnel,	Ashland,	do. do.		76,439.19	100,735.03	66,296.09	71,413.11	7.10
North Franklin, Nos. 1 & 2	Trevorton,	do. do.		39,340.06	73,134.04	52,633.17	84,537.14	63,180.05
Reliance,	Mt. Carmel,	do. do.		32,708.14	16,359.19	7,602.17	84,866.13	81,634.07
Locust Spring,	Locust Gap,	do. do.		22,699.11	72,623.10	43,094.05	65,770.02	94,143.07
Locust Run,	Ashland,	do. do.		52,953.03	80,940.00	41,450.03		
Big Mountain,	Shamokin,	Patterson, Llewellyn & Co.,		105,530.00	130,251.14	97,837.06	14,855.06	137,442.11
Excelsior,	Excelsior, Northumber'd co.,	C. W. Kingsley & Co.,		37,933.01	42,295.05	76,011.10	67,195.10	104,308.09
Enterprise,	do. do.	Thomas Baumgarden & Co.,		72,550.17	72,743.18	67,886.10	110,581.03	79,017.08
Locust Gap,	Locust Gap,	Graeber & Co.,		52,371.16	76,000.00	68,344.18	86,068.05	92,401.18
Henry Clay,	Shamokin,	J. Langdon & Co.,		83,374.14	81,169.04	9,998.01	137,188.07	109,691.03
Peerless,	do.	John Cruikshank,			12,087.07	33,499.15	23,038.10	29,231.11
Sterling,	Carbon Run, Northumber'd co.,	Kendrick & Fulton,		20,394.12	103,044.01	54,085.14	76,545.14	80,930.15
Royal Oak,	Shamokin,	Tillet & Son,		700.00	304.02	295.00	392.10	2,197.01
Ben Franklin,	Douteyville, Northumber'd co.,	Baumgarden & Co.,		31,145.01	21,334.00	38,622.03	51,604.13	38,411.16
Monitor,	Locust Gap,	George W. Johns & Bros.,		81,620.00	131,110.13	95,126.13	110,429.03	119,942.13
Cameron,	Shamokin,	Mineral Railroad and Mining Co.,		178,662.16	166,047.00	160,194.00	161,403.19	160,853.13
Luke Fidler,	do.	do. do.		100,544.11	119,576.15	103,964,16	114,654.06	118,643.03
Short Mountain,	Wiconisco, Dauphin county,	Lykens Valley & Short Mount'n Co		151,093.08		112,095.0[illegible]	194,784.00	171,417.05
Williamstown,	Williamstown, Dauphin co.,	Summit Branch Coal Company,		239,768.04	263,674.02	237,239.12	259,889.10	227,169.06
Lancaster,	Coal Run, Northumberland co.,	Smith & Keyser,		16,146.00	6,964.08	8,697.03	13,986.13	14,883.14
Black Diamond,	Mt. Carmel,	William Schwenk & Co.,		35,207.02	23,713.09	19,616.11	13,022.14	26,125.15
Hazel Dell,	Centralia,	Lykens Valley Coal Company,						16,270.06
Mt. Carmel,	Mt. Carmel,	Robertson, Montelius & Co.,		60,042.12	74,000.17	80,418.15	55,106.16	53,000.00
Big Mine Run,	Big Mine Run,	Jeremiah Taylor & Co.,			19,000.00	48,715.06	63,303.18	111,683.12
Continental,	Centralia,	J. T. Audenried & Co.,			25,228.13	53,857.17	107,603.00	79,598.00
Buck Ridge,	Shamokin,	May Audenried,		55,182.00	43,560.12	46,198.02	77,500.00	53,768.05
Glen City,	Glen City, Columbia county,	J. A. Losee,		17,454.06	14,784.14	22,430.15	26,762.04	11,128.18
Carson,	Shamokin,	Philip Goodwill,				1,430.00	5,185.00	11,460.02

Montana,	Montana, Columbia co.,	Miller, Rupp & Weaver,				68.15	118.05	
Pennsylvania,	Green Ridge, Northum'd co.,	Mineral Railroad and Mining Co.,					17,102.04	105,882.13
Franklin, No. 2,	Barry township, Schuylkill co.,	S. S. Bickel,				9,000.00	14,085.00	8,966.00
Greenback,	Greenback, Northum'd co.,	Gorman & Londy,		23,917.04		7,132.12	16,567.08	25,885.03
Brentzill,	Rocktown, Schuylkill co.,	Philip Brentzill,					75.00	
Rausch Gap,	Valley View, do.	W. H. Yohe,				453.10	986.00	896.17
Montana, No. 2,	Montana, Columbia co.,	A. H. Church,					10,345.18	11,276.19
Pioneer,		David Vaughn & Co.,						2.373.00
Shamokin,		George Tibbotts & Co.,						2,197.01
No Name,		Samuel Meyers,						70.00
Centralia,	Centralia,	G. M. Prevost,		38,267.19	62,976.00	62,133.10	37,805.00	
Hazel Dell,	do.	George Troutman,		29,334.00	45,420.00	6,835.00	13,193.00	
Lilly,	do.	do.				7,711.00	2,774.00	
Big Run Gap,	Williams Valley, Dauphin co.,	James Fennel,			2,008.05	1,794.00	2,703.10	2,568.00
Glen,	Centralia,	Bryson McBriarty,				3,000.00	2,000.00	
Kline,	Montana, Columbia co.,	J. L. Kline,				259.15	239.00	
Big Mountain, No. 2,	Mt. Carmel,	Northumberland Coal Company,		1,000.00		592.05		200.00
Vaughn,	Ashland,	D. Vaughn & Co.,		1,482.00		1,532.00	3,838.00	2,373.00
Little Mine Run,	Centralia,	Piffer & Geraghty,				9.10	23.00	
Gensil,	do.	Pulaski Gensil,				245.10	32.00	
Ashland estate,		A. Bancroft,		987.16			156.00	24.10
Bear City,		Frank Martz,					150.00	413.00
Germantown,		E. H. Herb,					167.10	
West Hazel Dell,	Rocktown, Schuylkil co.,	William Piffer,				202.00	117.00	
Centralia Outcrop,	Centralia,	James Sykes,					19.00	
Little Diamond,		Donahoe & Curran,					156.00	
Packer,	Mt. Carmel,	D. J. Lewis,			1,250.05	5,000.00	370.08	
Hickory Ridge,	Hickory Ridge, Northum'd co.,	Mineral and Mining Company,		9,622.17	23,241.04	2,520.02		
Big Lick,	Dayton,	Summit Branch Railroad Co.,		1,482,05	52,001.12			
Big Run Gap,	Big Run Gap,	do. do.		3,000.00				
Hickory Swamp,	Shamokin,	Mineral Railroad and Mining Co.,		30,872.04				
West Lehigh,	Glen City,	F. L. Shuman,		18,000.00				
North Side,	Lykens Valley,	Ed. Miller,			2,080.12			
Marshall,	Red Ash,	George Ronp,			971.16			
Franklin,		A. A. Heim,		4,253.07	3,844.06	3,528.07	2,172.02	
Montana, No. 1,	Centralia,	Daniel Beaver,						330.07
Total shipped to market,				2,588,005.17	3,229,357.00	2,816.747.14	3,720,603.16	3,285,216.15
Consumed or sold at colliery,				151,971.04	242,205.00	253,471.00	95,519.00	176,155.03
Total production,			3,348,726.00	2,739,977.01	3,471,562.00	3,070,218.14	3,816,122.16	3,461,371.18

LUZERNE AND CARBON COUNTIES,

MIDDLE DISTRICT.

Office of Inspector of Coal Mines,
Wilkes-Barre, Pa., *April 30, 1880.*

To His Excellency Henry M. Hoyt,
Governor of Pennsylvania:

Sir: I have the honor of presenting my first annual report as inspector of coal mines of the middle district of Luzerne and Carbon counties, as required by section twenty-first of the act entitled "An act providing for the health and safety of persons employed in coal mines," approved the third day of March, 1870. In my commission I was directed to assume the duties of the office July 19th, 1880, therefore my report as to accidents covers only that part of the year beginning July 19th and ending December 31st, 1880.

Tables have been compiled enumerating the accidents which proved fatal, and those which did not prove fatal; also a table showing the present state of the ventilation in all the collieries; the number of days worked by each breaker; the number of persons employed in and around the mines, and amount of coal produced from each colliery, together with other important statistics and useful information.

The number of lives lost during the above stated period were twenty-five, leaving eleven widows and thirty-six orphan children. Some of the latter were old enough and able to care for themselves.

The number of accidents not proving fatal were one hundred and thirty-one. Many of these were of a very slight character, and only caused a loss of few days of work. In my investigations into the causes of accidents I find that the miners are very frequently injured through having too much confidence in their ability to save themselves when incurring great risks, and very often take these risks to save little time or extra labor.

The most prolific cause of accidents to miners and laborers are falls of roof and coal, and as long as the miners persist to incur unnecessary risks this class of injuries will continue to be numerous.

The condition and appearance of the working places in mines changes with the explosion of every blast, therefore the periodical visits of the mine boss cannot be of any practical value to reduce the number of this class of casualties. No man should be employed to mine coal who is not fully competent to perform his duties independent of the care and watch of the mine boss. The latter cannot be present only occasionally, and the continuous change in the aspect of the working places makes it absolutely necessary that the miner himself should be practically competent to keep his working place safe and free from danger. It is by his own vigilant care can safety be ensured for himself and his laborer; but nevertheless we are cognizant of the fact that mine bosses have to interefere very frequently, and arbitrarily compel incompetent and negligent miners to secure their places in order to insure their safety while doing their work.

About twenty-eight per cent. of the whole number of accidents are caused by cars in various ways, and the sufferers are mostly boys who are employed in and around the collieries as drivers, runners, and door-tenders. A number of this class of accidents can with much propriety and justice be attributed to the carelessness of mine bosses, who leave dangerous obstructions and narrow places along the gangway roads in the mine, and are no better than traps left to cause injuries to the boys who have to work thereon.

The bosses are responsible for these prevailing man-traps, and it is within their power to remove them by cleaning the side of the main roads and providing enough room for the boys to do their work without incurring unnecessary risks. The boys are also lively, mischievous, and very fond of playing with danger, and a good efficient discipline is needed to effectively stop all useless, dangerous habits. It is within the power of the bosses to establish a system of rigid discipline, and they should deem it their duty to do so at all the collieries.

The causes, number and per centum of fatal accidents are classified as follows:

From falls of roof and coal, ...	7,	being	28 per cent
From explosions of powder, ...	2	"	8 per cent
From explosions of gas, ...	1	"	4 per cent
By cars in the mines, ...	7	"	28 per cent
By falling down shafts, ...	3	"	12 per cent
Miscellaneous causes inside, ...	1	"	1 per cent
Miscellaneous causes outside, ...	4	"	16 per cent
Total, ...	25	"	100

I learned from the officials at the mines that the number of fatal accidents for the whole of 1880 were fifty-one, against sixty-five for the year 1879. And the total production of coal during 1880, was 5,708,813.55 tons, which shows a production of 111,937.52 tons per life lost against an average of 97,080 tons per life lost during 1879.

The total number of persons employed during 1880 is 15,987, and the fatal accidents are equal to a little over 0.31 of one per cent., or one for every 319.74 of the whole number employed.

The result of my investigations into the condition of the collieries, the improvements manifestly needed, and a descriptive record of fatal accidents are fully set forth in the report, to which you are most respectfully referred.

Very respectfully submitted,
Your obedient servant,
G. M. WILLIAMS,
Inspector of Coal Mines.

WILKES-BARRE, PA., *February 28th, 1881.*

TOTAL AMOUNT OF COAL MINED DURING 1880.

	Tons.
Lehigh Valley Coal Company,	657,269.04
Lehigh and Wilkes-Barre Coal Company,	1,542,647.71
Delaware and Hudson Canal Company,	1,032,104.87
Susquehanna Coal Company,	772,509.50
Miscellaneous coal companies,	1,704,282.43
Total of all coal companies,	5,708,813.55

NUMBER OF FATAL ACCIDENTS, AND AMOUNT OF COAL PRODUCED PER LIFE LOST.

NAMES OF THE COMPANIES.	Killed.	Coal mined per life lost—tons.
Lehigh Valley Coal Company,	4	164,317.26
Lehigh and Wilkes-Barre Coal Company,	12	128,553.97
Delaware and Hudson Canal Company,	3	344,034.95
Susquehanna Coal Company,	17	45,441.72
Miscellaneous coal companies,	15	113,618.82
All coal companies,	51	111,937.52

NUMBER OF EMPLOYEES, AND TONS OF COAL MINED PER PERSON EMPLOYED.

NAMES OF THE COMPANIES.	Number of persons employed.	Coal mined per employé—tons.
Lehigh Valley Coal Company,	1,594	413.11
Lehigh and Wilkes-Barre Coal Company,	4,618	331.89
Delaware and Hudson Coal Company,	2,735	375.85
Susquehanna Coal Company,	2,297	336.31
Miscellaneous coal companies,	4,743	368.17
All coal companies,	15,987	357.09

AVERAGE NUMBER OF DAYS WORKED, AND TONS OF COAL MINED PER DAY FOR EACH PERSON EMPLOYED.

Names of the Companies.	Days worked.	Tons mined per employé.
Lehigh Valley Coal Company,	182.39	2.26
Lehigh and Wilkes-Barre Coal Company,	169.12	1.96
Delaware and Hudson Canal Company,	179.19	2.09
Susquehanna Coal Company,	233.02	1.45
Miscellaneous coal companies,	173.43	2.12
All coal companies,	187.43	1.90

CLASSIFICATION OF FATAL ACCIDENTS WHICH OCCURRED FROM JULY 19 TO DECEMBER 31, 1880, INCLUDED.

Causes of Accidents.	Number.	Per centum.
By falls of roof and coal,	7	28.00
By explosions of powder,	2	8.00
By explosion of gas,	1	4.00
By cars underground,	7	28.00
By falling down shafts,	3	12.00
Miscellaneous causes—inside,	1	4.00
Miscellaneous causes—outside,	4	16.00
Total,	25	100.00

INJURIES NOT PROVING FATAL.

Causes of Accidents.	Number.	Per centum.
By falls of roof and coal,	31	23.66
By explosion of powder,	13	9.92
By explosion of gas,	20	15.27
By cars underground,	37	28.24
Miscellaneous causes—inside,	20	15.27
Miscellaneous causes—outside,	10	7.64
Total,	131	100.00

Number of widows, 11; orphans, 36.

GENERAL CONDITION OF THE COLLIERIES.

I entered upon the duties appertaining to the office of Inspector of Mines July 19, 1880, and immediately entered upon a tour of general inspection throughout the collieries of my district, with a view of getting acquainted with their situation and general condition, as compared with the requirements of the law. It is due to the officers of the several collieries for me to state here that, without one exception, their demeanor towards me was courteous and obliging, and they showed no tendency to conceal anything from my inspection, whether it was in conformity with the law or not. I found that the dangerous parts of the machinery in the breakers were well guarded with covers and railings as the law requires. In a few instances, the attention of the foremen was called to what might prove dangerous places, and they immediately attended to them and had them surrounded with the necessary protection.

The dangers are more variable and surrounded with much greater difficulties to remove in the underground workings of the collieries. Here it appears to be destined by nature that the vocation of the miner shall be extremely hazardous, and his perilous situation, in some collieries, is such as require great skill and long practical experience to cope successfully with them. We have two classes of foremen or mine bosses superintending the collieries. (1) Those who realize the extent of the responsibility of their charge, and are, in all respects, fully qualified to perform their arduous duties satisfactorily. In going through the mines under their charge, they are found in excellent order; the main avenues are kept clean and clear of all dangerous obstructions; an ample supply of pure, fresh air is provided for the men to respire in all parts of the workings; the facilities for transportation of coal are good, a strict effective discipline is exercised and everywhere manifested; the operators are reaping benefits and are not annoyed by complaints from the men. Here the true principles of economy in mining are exercised, which are conducive to the health and safety of the men, as well as remunerative to their employers, and of these collieries there is nothing to state that is not commendable and praiseworthy.

(2) Those mine bosses who are not so well versed in the art of their calling or profession, and to whom the ventilation act seems very annoying, and the mine inspector a kind of nuisance that must always be tolerated. The condition of the mines under these gentlemen's charge suggested to the writer the propriety of the following remarks and suggestions:

FALSE ECONOMY.

The health and safety of the workingmen in coal mines are frequently much jeopardized through a want of sufficient care and interest in their welfare on the part of the officials having immediate charge of the mine; and the attention of the second class of bosses seems to be wholly absorbed in efforts to get coal out at a minimum cost, regardless of any system or principle upon which the health and safety of the men or even success in future operations depend. It is, evidently, the result of a false idea of economy, arising from inexperience with a more efficient system of mining. The natural consequence is that when the mine is fully developed and opened into a net-work of intricate passages, it becomes very difficult to conduct the ventilation properly to the face of the workings, and especially in sufficient quantity to sweep away the smoke and obnoxious gases prevalent in the mine without an outlay of extra expense. In some instances it has been found necessary to sink new air-shafts, and re-arrange the system of ventilation before it could be done with any degree of success.

When a colliery is thus worked, without regard to a system, upon which successful mining in all its branches can be carried on, it soon becomes a difficult task, recurring every day, to bring out the amount of coal required to pay current expenses. A mistaken policy is manifested everywhere throughout a mine, and is attended with endless losses and delays, from numerous causes. The money that should be applied to improve the condition of the mine, and keep it in good working order, is devoured in vain efforts to cover losses entailed in numerous ways, as the inevitable consequences of a system of mining, the principles of which is so graphically described in the ancient English maxim, " a penny wise, pound foolish policy." These remarks are not meant to apply to any particular colliery, and, yet, there are sections of many collieries in this district, to which they are truly applicable. For instance: (1.) Those collieries wherein the gangways have been driven thousands of feet from the shaft or slope, and to save the small expense of removing the refuse material as they advanced, it was allowed to remain all along the gangway roads, and is now a constant source of trouble and tedious delays to the drivers, throwing the cars off the track, causing injuries to the mules, and what is still more serious, a prolific cause of accidents to the drivers and runners, while doing their work thereon.

It is an established fact that the gangways should always be driven wide enough for a mule to pass the cars at all points. They should also be kept clean, so the boys could run along with the cars without danger of being tripped and thrown under them. Then the air current would also have ample room to travel, with a minimum resistance, which is of great importance to the ventilation of every coal mine.

2. Those collieries where the true principles of economy are obviously not understood, and the health and safety of the men, to some extent, overlooked. An ample supply of fresh air is as important and vital to successful mining, as the sap is to the tree. It breathes life, health, and contentment to the men, and gives them a clear atmosphere and plenty of light to see their work. Supplying an adequate amount of ventilation, is one of the most important questions that can engage the attention of mine officials, and one that should be understood, to some extent, by all who work underground. However, an investigation of the condition of some collieries, would reveal the fact, that much ignorance still prevails on the subject, and a perusal of table No. 8 would, to some extent, emphasize the remark. All our mining text books are advocating splitting the air current into a number of separate splits or panels. The mine ventilation law demands this in mines where gases are emitted. And the increase of ventilation, claimed to be derived from that system, is daily proven true and beneficial in practice. About three fourths of our foremen undoubtedly understand it, and have tested the beneficial results derived by adopting that system in the mines under their charge. But there are some clinging to the old crude system of conducting the air in one continuous current, from one end of the mine to the other, and by the time it arrives at the last working places it is unfit for respiration, and is thickly charged with a fog

of powder smoke, and obnoxious gases, breeding ill-health to all who are compelled to inhale it. It is a condemned system, and those who still practice it, should at once discard it and adopt the improved one of splitting the air, through which the resistance by friction is reduced, and much larger quantity is obtained by the same propelling power.

3. The prevailing indifference to the size of air-ways and cross-cuts is an inexcusable error, and invariably results in small, contracted air passages, and inadequate ventilation. The laws affecting the circulation of air through confined passages of mines have been ascertained by eminent scientists, and are quoted in our text-books. We are taught that when air is impelled through a confined passage, the pressure required is proportional to *the square of the velocity;* so that with double velocity there must be four times the pressure; to treble it, nine times; and so on. The same expenditure of power on the air in a forty-foot passage would propel double the quantity it would force through a twenty-foot passage, or an equal quantity would be propelled by half the power.

The practical lesson taught by natural laws are manifestly the following:

(*a*) "That, as with the same pressure the quantity of air is directly proportional to the nature and extent of the rubbing surface and the sectional area of the passages, all air-ways should be well cut, of large size, and free of sudden contractions.

(*b*) That, as with the same power the quantity of air propelled is directly proportional to the length of the passage, the circulation will be largely increased by judiciously splitting the air-current and separately ventilating different sections.

(*c*) That only by attending to these points can efficient ventilation be produced, and the waste of power prevented that ensues when the currents are propelled at a high speed."

In the coal veins of this district, large air-ways can be maintained without incurring extra expense; and in those collieries where small, contracted ones are tolerated, satisfactory reasons for their existence cannot be given. We are cognizant of the fact that, where the ventilation is poor and inadequate, fault is found with the fan's capacity for producing ventilation; and in some cases larger fans were constructed to supersede smaller ones, with a view of supplying the deficiency, when far better result could be obtained by enlarging the air-ways, and judiciously splitting the air columns. To double the quantity of air passing through the same air-ways, would require four times the pressure, where, by splitting the air-current and enlarging the cross-cuts, the velocity could be reduced, so that the same result could be acquired without increasing the power.

A small fan with favorable conditions will produce an excellent current of ventilation; and it certainly costs less to run it than it does to run a large one. The Bellevue fan, of which so much is spoken, is only twelve by four feet, open periphery and revolving disc, running one hundred revolutions per minute, and producing a ventilation of from 140,000 to 160,000 cubic feet, with a water guage of only 0.2 inch. This excellent production is not to be credited to the fan alone, for there are others of exactly the same size and description, running at the same speed, but fail to produce anything like that result. The difference is in the conditions upon which they are placed. The water guage indicates the power expended to overcome the resistance to the air by friction, and in the case cited, there is only 0.20 water guage. The air current is divided into eight separate splits, and the air-ways are large. By that, the distance over which the air must travel is shortened and its velocity much reduced, and that accounts for the extraordinary small water guage indication, and the splendid amount of ventilation obtained.

If all the air was compelled to travel the whole length of all the splits in one continuous current, and through contracted air-ways, so that the water guage would indicate 0.60 inch, the fan would not produce more than about 48,000 cubic feet without increasing its speed. These are unquestionable facts which have been tested and proven correct in practice, and if they were properly understood and acted upon in more of our collieries, there would be less waste of power and a larger improvement in their sanitary condition.

UTILIZATION OF POWER.

There are three modes of ventilation in vogue, to some extent, in this district, viz: The furnace, the forcing fan, and the exhausting fan. The latter is most generally adopted. Ventilation, by whichever mode, is caused by the difference of density and weight of the air in the down-cast and that of air in the up-cast. The more this difference, greater will be the amount of air impelled through the mine.

Every factor that can be employed to contribute to the enhancement of difference in the density of air at the said points should be utilized to that purpose, and the benefits derived from an increased ventilation would be the result. Heat is a power, and the furnace mode of ventilation exemplifies the fact. From it we should learn that whether it is derived from the consumption of fuel, from the consumption of powder, from steam pipes, or from natural causes existing in the earth, it will essentially have the same effect. And, although the resources from which heat is radiated are numerous and wide-spread in a colliery, it can, in most cases, by a judicious arrangement of the plan of ventilation, be made to contribute to the assistance of the ventilating power.

Steam pipes, steam pumps, and steam engines should invariably be placed on the return airways, and the same should be done where it would be practical with everything which radiates heat. Otherwise, if they are left in the intake, the power represented by these factors would work adversely to the ventilating power, and a loss would be sustained equal to twice the motive power of the heat so generated. A number of cases could be cited where this principle is overlooked, and the fan has to run a certain speed in order to equal the adverse power of the heat so radiated in the intake. This is a waste of power that ought not occur, and the true principles of economy are those which utilize this power. They are principles which are conducive to the health and safety of the workmen, and to the remuneration of the employers.

ASCENSIONAL VENTILATION.

This is a subject closely allied to the one just treated of; and in practice, the ascending principle of ventilation is necessary in conjunction with the right mode of utilizing natural heat power. The coal seams of this district are lying at an angle of from a minimum to forty-five degrees; but the most general inclination is from fifteen to thirty degrees; they are, therefore, favorable to the ascensional mode of ventilation. By that is meant the practice of conducting air into the mine so that it shall, in the first place, go directly to the lowest part of the workings and afterwards ascend on its course to the outlet.

The air is generally cooler and heavier in the intake than in the outlet airway, and is favorable to a direct descent to the lower part of the workings, and as it becomes warmer and lighter will naturally ascend to the highest workings.

The slightest changes in the temperature of air produce variations in volume, density, and pressure, and the emission of light gases and aqueous vapor produce similar results. When we consider these facts it becomes obvious that the atmosphere of a mine, subject to these changes, cannot be at rest; but will inevitably be in an unending motion. It is essential, therefore, to utilize this restiveness by arranging the ventilation so that that motion be unceasingly towards the outcast opening.

The weight of a given volume of air in the return air-way of most collieries is less than that of an equal volume in the intake air-way, and as long as the coolest air is entering the mine it will, by its own gravity, have a tendency to go directly to the lowest workings, and force the warm, light air upwards from there. Hence, the advantage gained by adopting the ascensional principle of ventilation is apparent; in fact, it should be adopted in all mines working pitching veins, and especially where light gases are emitted.

The exudation of carbureted hydrogen gas, the lightest thing in the world next to hydrogen, would be equal to an additional ventilating pressure, if the ventilation was properly arranged, and it would have the effect of increasing the amount of air circulating through the workings. As stated before, the return air of mines is generally less dense, in consequence of being usually higher in temperature and impregnated with light gases, and will naturally, by its own gravity, ascend to the outlet. It is, generally speaking, wrong in principle to bring return air down the pitch of steep lying seams, even for a small distance, if that can be avoided.

By so doing, the advantage derived from the natural tendency of warm air and light gases to ascend is not only lost, but an additional pressure, equivalent to that lost advantage, is required to counter-balance its opposing effect. Hence, it would be profitable to mine officials to arrange the ventilation consistent with the principles of ascensional ventilation, and provide air-ways for the return air, so far as it would be practical, to ascend from the lower lifts in a continuous upward course to the out-let. It is already practiced, to some extent, in many of our collieries; but a little more forethought on the matter would certainly result in much improvement, even in the best ventilated collieries, and it would be productive of much good to the health and comfort of the men working in those mines. The utility of this principle is not questioned, and I urgently recommend its adoption wherever it can be applied in the collieries of my district.

THE DANGEROUS EFFECT OF NATURAL FORCES UPON VENTILATION.

In mines where explosive gases are freely emitted it is extremely dangerous to have the regular flow of the air currents disturbed, or, even decreased. The out-flow of gas is unceasing ; nothing can decrease the quantity emitted but an increased pressure in the atmosphere or the reduction of its own pressure by exhaustion. Only a very small percentage is needed to mix with air, to convert the whole into a violent inflammable compound. The marginal quantity of air may be large, but if the current should be stopped for a few minutes, enough gas might be emitted to convert the whole atmosphere of the mine into an explosive mixture. An era is dawning upon us when the possibility of general disaster by explosions of gas is becoming apparent; and while there are yet no reasons to fear such catastrophies occurring, due precautions should be taken to avert the possibility of such grave calamities.

The mechanical contrivances which affect the regularity of the ventilation are dilligently guarded, but there are hidden influences in the atmosphere, which are not within man's ability to control, and which have a very material effect upon the ventilation and exudation of gases in mines. An effort should be made to understand these disturbing elements, and to avert their detrimental effects upon the ventilation before an accident is precipitated.

We are familiar with the effects of natural ventilation and its fluctuating tendencies, moving now in this, and again in that direction. And thus the same air remains for hours in the mine, striving to attain a state of equilibrium. During very cold weather a steady flow of air, in one direction, is maintained, and in very warm weather the stream is reversed, and will steadily move in the opposite direction. Such are the effects and vicissitudes of natural ventilation.

The superior force of the fans maintains a constant current as to direction, but the quantity is varied and greatly disturbed by the hidden forces which are ceaselessly at work ; now their power is expended to assist the fan and again to resist it. The natural forces are unabating in their strife the same as if the fans were not in existence. In some cases difference of about 20,000 cubic feet per minute in the quantity of ventilation is found in warm summer weather, and that of very cold winter.

This is a very important item in a gassy mine, where a steady flow of the maximum amount is relied upon to keep every part of the mine safe, and it is a matter worthy of serious thought to find a remedy for it.

It is evident that where fans are used nothing is gained by natural ventilation, and that much harm prevails through its detrimental effects. Our duty then is plain, that whenever a fan is constructed to ventilate a mine, and especially a gassy mine, it should be erected where these natural forces could not display themselves in a way that the constancy of the air currents would be disturbed.

The phenomena of natural ventilatilation, as is well known, arises from the difference of elevation existing between the top of the two openings which constitute the downcast and upcast. Where there is no difference in the elevation of those two openings, the phenomena of natural ventilation scarcely ever appears, and this, certainly, should be the relative state of the said openings to a mine ventilated by a fan. The vacillating effects of atmospheric changes would then be obviated to a great extent, and a regular flow of air obtained.

Hitherto, the fans have been erected with but little thought, and less effort to avoid the disturbing influence of the atmosphere. They were generally erected where an outlet could be easiest obtained. In some cases, to save sinking a few feet in the depth of an air-shaft, they were located in a hollow depression of the ground, and in close proximity to a hill or a cliff; and during every severe storm coming from a certain direction, the force of the wind would be directed pointedly by those hills or cliffs against the exhaust ducts of the fans, and almost revert the currents of air.

Mr. Thomas D. Davies, superintendent for the Delaware, Lackawanna and Western Railroad Company, related a case where they had to remove a fan on account of the disturbing effects of storms. An angular hill on the south side directed the powerful force of the north and west winds right against its exhaust duct, and, at times, it disturbed the ventilation to such an extent that the safety of the men became, at last, considered a serious question. Fortunately, the effusion of explosive gas was not large in that mine, or an explosion might have been precipitated. However, they wisely concluded to remove the fan to a place where the winds could not so affect it, and they have learned a lesson, which they mean to observe hereafter, when a fan is to be erected on any of their collieries.

The conclusions arrived at when these phenomenal effects of natural forces are taken in consideration, are that:

1. To obtain a steady, regular current of ventilation in a colliery with a fan, the inlet and outlet should be, as near as it would be practicable, on the same level or horizontal plane.

2. That the fan should be located on a plain clear surface, so that high winds could not be directed against it, and prevent a free exhaustion of the air.

If these points had been at all times observed, the vast difference now apparent in many colleries, between the amount of ventilation in summer and that of the winter season could not occur, and the result would have been the enjoyment of a much better and safer system of ventilation. Certainly, for the deep mines, which must be opened in the future, every point upon which safety depends, should never be overlooked or forgotten.

RECORD OF IMPROVEMENTS FOR 1880.

Lehigh Valley Coal Company.

At the Mineral Spring slope, three short tunnels were driven from the Baltimore into the Ross vein. Their lengths are forty-nine, sixty two, and ninety-two feet, and the thickness of the seam where they have entered is in the upper lift four feet six inches, and in the lower lift six feet.

At the Henry colliery, the Baltimore vein is divided by a very thick rock, and a tunnel was driven from the bottom part of the vein into the upper part. It is two hundred and twenty-four feet in length. Two air-shafts were sunk through the same rock, from the upper part of the Baltimore vein to the lower one. They are thirty-four and forty-five feet in depth.

Lehigh and Wilkes-Barre Coal Company.

At the Diamond shaft, a tunnel was driven from the Baltimore vein to the Hillman. It is five hundred and twelve feet in length, and a sectional area of one hundred and twelve feet. The grade is about eighteen degrees. A large territory of the Hillman vein is convenient to work from this tunnel, and they are now driving a second opening in order to bring forward the ventilation for the purpose of working it.

At the Hartford colliery, a new slope was opened from the surface down to the lower lift of the workings, and is to be extended to the bottom of the basin after working the upper lift out. It is now fifteen hundred feet in length, on an average grade of fifteen degrees. Two new tunnels were also driven at this colliery; one from the Baltimore vein to the Ross, and the other to the Red-Ash vein. Both these veins are now being worked from these tunnels, and each has a large territory to mine from.

At Sugar Notch, No. 9, colliery, a new tunnel was driven from the Ross, to work the Red-Ash vein. It is three hundred and sixty feet in length, and eighty-four feet sectional area.

At No. 10 slope, a tunnel was driven from the Kidney to the Hillman vein. It is two hundred and forty feet in length, and the vein at the point entered is ten feet thick, and of a good quality of coal.

Delaware and Hudson Canal Company.

At the Mill Creek slope, a tunnel was driven to be used for an air-course. It is one hundred and fifty feet in length, and one hundred and twelve square feet of sectional area.

At the Laurel Run slope, they sank a new air-shaft, twelve by thirty feet sectional area, and erected a new fan, thirty-five feet diameter, upon it, which has improved the ventilation of that colliery greatly. For full description of the fan, see Table No. 1.

At the Baltimore tunnel, a new tunnel is now in progress, from the Baltimore to the Red-Ash seam. It is at present about twelve hundred feet in length, and is expected to go about three hundred feet further before striking the coal. It is intended for a mine locomotive to haul the coal out from this tunnel when completed, and is driven large enough for that purpose.

At the Conyngham shaft, the second opening is through, and a breaker is now in course of construction at the top of the shaft. By the time they will be ready to ship coal through the breaker. the gangways will be driven a goodly distance, and will have room to open a number of chambers, and give a good quantity of coal when they start.

Susquehanna Coal Company.

The No. 5 breaker, a large structure capable of shipping over one thousand five hundred tons per day, erected by this company at Nanticoke, was completed ready to ship coal on the first day of April, 1880.

A new fan was erected at No. 1 slope, a description of which is given in table No. 1. The ventilation of this mine was much improved by the erection of this fan, and is now in pretty good order.

At the grand tunnel, West Nanticoke, a new underground slope was driven down to a basin, which was a considerable distance below their workings. The slope is one thousand four hundred feet in length, and has an average grade of seven and a half degrees. It opened a convenient territory of excellent coal.

Delaware, Lackawanna and Western Company.

At the Avondale colliery a new underground slope was opened a distance of one thousand eight hundred and forty-five feet, on an average grade of twelve degrees. A large territory of excellent coal can be worked from this slope, and is convenient to the shaft.

They also drove a new plane, extending above their present workings a distance of one thousand four hundred feet, from which a large amount of coal is expected to be mined. This makes the fourth plane, one extending above the other, on the same pitch.

The Kingston Coal Company.

This company is sinking a new shaft near their present No. 2 shaft. The sectional area of it is twelve by thirty-three feet, and it is down at the time of this writing four hundred and seventy-five feet. They contemplate sinking it through the Ross and into the Red Ash veins, both of which are to be worked from it.

In the No. 2 shaft an underground slope was driven down to a length of one thousand three hundred and fifty feet, on a grade of one in twelve. They also drove a tunnel from the Cooper to work the Bennett vein.

The Gaylord Coal Company.

This company is sinking a very large shaft near their present colliery in Plymouth. It is twelve by forty-eight feet, and is to cut all the veins from the surface to the Red-Ash. They are down now a depth of four hundred and twelve feet, and have gone through the Cooper, Bennett, and Ross veins.

J. H. Swoyer.

At the Forty Fort colliery the shaft was extended down from the Bennett to the Ross vein, a distance of two hundred feet, and is now beginning to open on that vein. At the Wyoming colliery an underground slope was driven down one lift.

W. G. Payne.

At the East Boston colliery a new tunnel was driven a distance of one hundred and fifty feet, from the Bennett, to work the Cooper vein.

Plymouth Coal Company.

The Dodson shaft, of this company, was extended down a depth of one hundred and eighty feet and struck an excellent vein of coal, which is believed to be the Baltimore. This mine is about finishing to work in the Bennett vein, which was thought to be a split of the Baltimore, and the discovery of the vein just struck was a very agreeable surprise. It is sixteen feet thick, and the coal is of excellent quality. The second opening, at this writing, is down ninety feet, and will soon be sunk into the new vein, when communication will immediately be made with the workings from the shaft.

NEW FANS ERECTED DURING 1880.

The importance of furnishing the means for supplying good ventilation is more fully realized every year, and it is very gratifying to see the increased efforts made towards improvements in the construction of the ventilators.

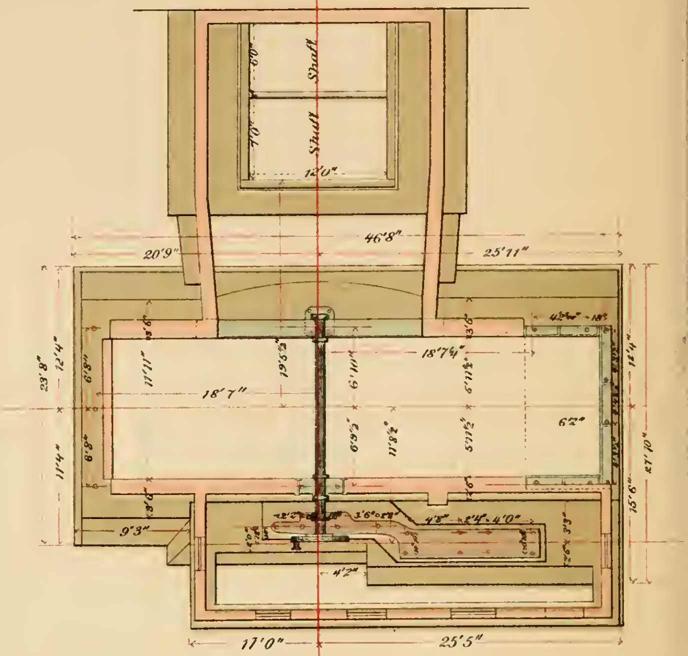
Ten new fans have been erected in this district during the last year, and they are all giving excellent results, which amply compensate the expenditure made in their construction. Two of them are thirty-five feet in diameter, viz: The one erected at the Hollenback shaft by the Lehigh and Wilkes-Barre Coal Company, and the other at Mill Creek slope by the Delaware and Hudson Canal Company.

A plan of the Hollenback fan is kindly furnished for this report by Mr. Thomas R. Griffith, one of the company's mining engineers, and it gives a very full description of it, to which the reader is referred. It is erected upon a massive foundation of mason-work, and has a brick-house covered with sheet iron roof. It is running at a speed of twenty-five revolutions per minute, and is exhausting one hundred and twenty-five thousand cubic feet of air per minute with a half inch of water-guage. Another fan of the same dimensions was previously erected upon this colliery, but was not built on so substantial a foundation. Both are kept running at low speed, and are jointly supplying a current of air equal to two hundred and twenty-five thousand cubic feet per minute. This is, I believe, the largest quantity of air circulating at present in any mine in the United States, and there are but few mines having equal quantity in Europe.

The Delaware and Hudson Canal Company's fan at Mill Creek slope is running forty-five revolutions per minute, and producing a current of one hundred and fifty-five thousand cubic feet of air per minute, with a water-guage of one and seven tenths inches. As the water-guage is indicating, the friction and resistance to the flow of the air in this mine is very great, and yet the fan is producing a good current. By removing the cause of resistance the result could, without doubt, be yet much increased.

The Susquehanna Coal Company's fan, erected at No. 1 slope, is twenty-five feet diameter, and when running at a speed of sixty-five revolutions per minute, produces a current of one hundred and sixty thousand cubic feet of air per minute, with a water-guage of one and seventy-five one hundredth inches. Here also we have an indication of great resistance by friction of the air in its passage through the mine. If that could be reduced by dividing the current into more separate splits and enlarging the airways, a better result still could certainly be obtained. Yet these results are very good as compared with what we have in many collieries.

For informations concerning the other fans see Table No. 1, which gives a description of them and of the fan engines.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23'8"
12'4"
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18'7"
19'5½"
6'10"
18'7¼"
13'6"
5'11½"
6'9½"
11'8½"
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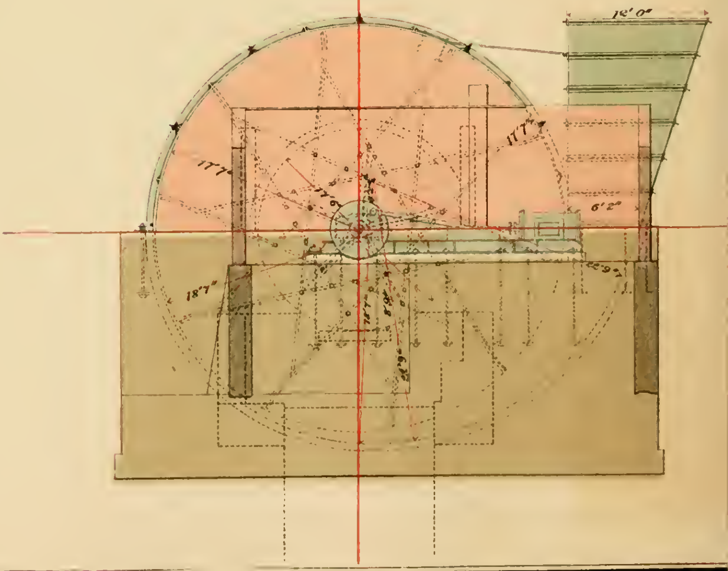
12'0"
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17'7"
6'2"
18'7"
22'9"

PLAN
OF
35 $^{\text{FT}}$ FAN
FOR
HOLLENBACK SHAFT

L.&W-B.C.C$^{\text{o}}$

TOM. R. GRIFFITH, DEL SCALE 16 FEET TO 1 INCH

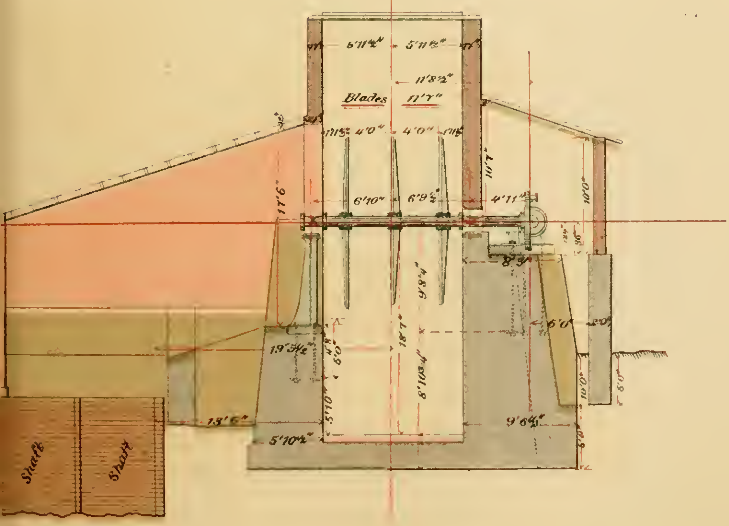


TABLE I.—*Giving details relative to New Fans and Fan Engines erected during 1880, in the Wilkes-Barre or Middle District, composed of Carbon and Luzerne counties.*

Names of the Collieries.	Pattern of fan.	Dimensions.		Side inlets.		Working speed in revolutions per minute.	Sectional area of		Cubic feet of air per minute exhausted.	Water-gauge on fan side.	Horse power of fan.	Fan Engine.	Dimensions of steam cylinder.		Gearing.	Steam pressure—pounds.	Horse power of engine.
		Diameter of fan in feet.	Face of fan in feet.	No. of inlets	Diameter of inlets.		Up cast in squ. feet.	Down cast in square feet.				Horizontal or vertical.	Diameter in inches.	Length in inches.			
Hollenback, ...	Guibal,	35	11′ 10′′	1	17′ 6′′	25	148	250	125,500	0.60	11.86	Horizontal, . .	20	48	Direct, .	75	100
Hartford, ...	Guibal,	30	10′ 0′′	1	12′ 0′′	45	120	140	87,000	.	.	Horizontal, . .	18	36	. . .	60	40
Mill Creek, ...	Guibal,	35	10′ 0′′	1	18′ 0′′	45	126	200	155,000	1.70	41.52	Horizontal, . .	28	48	Direct, .	80	140
Laurel Run, ...	Guibal,	17	4′ 0′′	2	8′ 0′′	62	119	119	78,360		. .	Horizontal, . .	14	22	Belt.		
Nanticoke, Slope No. 1, ...	Guibal,	25	7′ 0′′	1	12′ 6′′	65	160	410	160,000	1.75	44.12	Horizontal, . .	18	36	Direct, .	70	100
Kingston, No. 2, ...	Guibal,	25	8′ 0′′	1	12′ 6′′	35	132	140	80,000	0.20	2.52	Horizontal, . .	18	36	Direct, .	75	71
Gaylord, ...	Guibal,	15	4′ 6′′	2	5′ 0′′	100	100	112	60, 00	. . .	. . . .	Horizontal, . .	12	24	. . . . . .	50	110
East Boston, ...	Guibal,	15	4′ 0′′	2	4′ 0′′	40	80	230	55,000	. .	. . . .	Horizontal, . .	12	24	Belt, . .	40	30
Red Ash, ...	Guibal,	15	5′ 0′′	1	7′ 6′′	50	64	100	40,000	. . .	. . . .	Vertical, . . .	14	18	Direct, .	60	30
Raubville, ...	Guibal,	16	5′ 6′′	2	6′ 0′′	60	84	140	50,000	. . .	. . . .	Horizontal, . .	10	24	Belt, . .	45	15

THE PERILS OF FAST HOISTING IN SHAFTS.

I shall here call attention to a singular accident which occurred November 1, 1880, at No. 1 shaft, Susquehanna Coal Company, Nanticoke, Pennsylvania. Ten men were on the cage descending the shaft in the morning, and evidently were left down at a higher speed than was intended by the mine ventilation law. When at the upper vein, the fans used for the purpose of sustaining the cage at that landing, were unexpectedly standing closed, and instantly stopped the cage in its descent. The force of the momentùm attained in the rapid descent, precipitated the men in a heap on the bottom of the cage. Three of them, viz: Joseph Turner, the mining boss, Charles Willis, and William Donnelly, miners, had each suffered a fracture of one of their knee-joints, and Joseph Seignor his back severely jarred. The other six were terribly jarred, but soon recovered. The cage was very much shattered, but fortunately kept together. A mule had been sent down on the same cage before that, and the crib used to guard it was left on, and this saved the men from falling out through the sides and down the shaft. Those who witnessed the occurrence, say that it was a miraculous escape that they were not all hurled into eternity at once, and it is, in fact, surprising how they saved themselves. I shall not attempt a minute description of the accident, for my object in noting it is to call attention to the dangers prevalent in this district, by too fast hoisting of the men through the shafts.

The mine ventilation law, section eleven, provides that "the engineer shall work his engine slowly and with great care when any person is ascending or descending the shaft or slope. And no one shall interfere with, or in any way intimidate the engineer in the discharge of his duties. And upon any person violating the provisions of this section, he shall be held, and be deemed guilty of a misdemeanor, and, upon conviction thereof, he shall be punished by fine and imprisonment at the discretion of the court trying the same."

The law, on this point, is very plain, and the engineers cannot evade their responsibility, nor throw it on any one else when an accident occurs through fast hoisting. They must not allow themselves to be hurried when men are ascending or descending the shafts, for they are then directly responsible if an accident should occur.

Generally, throughout this district, the machinery are working on first motion, or in other words, the engines are directly connected to the drums. Every stroke of the engine is causing one revolution of the drum, and where the drum is large, the velocity of the cages in the shaft is very great when the engines are running at a slow rate.

The average diameter of the drum at No. 1 shaft, where the accident referred to occurred, is twelve feet. And for every stroke of the engine the cages pass through a distance of thirty-six feet. Less than sixteen revolutions bring them from the bottom to the top, a distance of five hundred and seventy feet. The average time taken to accomplish that is thirty seconds, which is equivalent to nearly thirteen miles an hour. This is certainly too high speed to ensure a safe transmit for men. For if the cage should be caught in its ascent, something would instantly have to break. And on the other hand, if it should be caught by descending, even for a fraction of a second, there would be many feet of slack rope which might, if the cage should get loose, be the cause of precipitating the cage and men to the bottom of the shaft. There are many ways by which serious accidents may happen while disregarding the quoted section of the law, and the one referred to might serve as an example of one way.

It is evident that the object of this section of the law is to guard against accidents, and provide a slow, careful transit for the men through the shafts or slopes, so that the engineer could instantly stop, in case the cage met with an obstruction, and avoid as far possible, the occurrence of accidents. A glance over the amount of work done in our collieries, the large number of persons employed therein, and the limited amount of time allowed for the conveyance of the men through the shafts, reveals the fact, that too much haste prevails, and too little regard to the provision of the law.

In the collieries where there are from four to six hundred persons employed, a considerable amount of time must be expended in letting the men down in the morning, and hoist them again after completing their day's work. Every ten persons must have a cage to go down, and another to come up. The transit of five hundred persons would require fifty cages twice a day, and at the ordinary rate of hoisting coal, this number would consume about two hours of time. But men should never be hoisted at a rate higher than one half that of coal. They generally go to the mine in the morning from six to quarter past six, and no matter how many there are, they must all be counted, ten at each time, and sent down by seven o'clock, when coal must be hoisted. Where there are over four hundred persons employed, it is evident that they are sent down at a speed much higher than the law specifies, and a great risk is incurred by so doing.

At the Conyngham shaft, and at No. 4, Plymouth, the Delaware and Hudson Canal Company have provided special places to hoist, and let down the men, which are as convenient as the hoisting shafts, and the machinery are geared so that they cannot be worked too fast.

The Lehigh and Wilkes-Barre Coal Company could, with little expense, make a similar provision at the Hollenback shaft, Wilkes-Barre.

Where there are more than from three to four hundred persons employed in one mine, a special provision should be made to hoist, and let them down without incurring the necessity of doing it at a dangerous speed. This will be very important for the deep, extensive mines which will inevitably have to be opened in this district in the future, as the shallow seams are now nearly all exhausted.

DESCRIPTIVE RECORD OF FATAL ACCIDENTS.

Fatal Accidents by falls of Roof and Coal.

Accident No. 1.—Patrick Bolger, a miner, age sixty years, was seriously injured by a fall of roof at the Hartford colliery, Ashley, July 28, and died within two hours after he was taken home. He had noticed a dangerous piece of roof near the face of his chamber, and after some fruitless efforts to bar it down concluded to stand two props under it. He then began to clear a place for the props by raking the coal into the chute, and while thus employed the roof fell with the result already stated. He left a widow with eight children.

ACCIDENT No. 3.—Isaac Withey, a tracklayer's helper, age thirty-six years, was fatally injured by a fall of roof at No. 2 shaft, Nanticoke, Pa., July 28, and died July 30, at the Wilkes-Barre hospital, leaving three orphan children in Somersetshire, England. The deceased had been nailing strap-iron on a wooden branch of the track over which a dangerous piece of rocky slate hung, he had just completed his job, and was in the act of picking up his tools to leave when the rock fell. The edge struck him over the hips, causing injuries from which he never recovered. He left no wife.

ACCIDENT No. 4.—John Sulkofski, a miner, age thirty-six years, was killed July 31, at tunnel No. 2, Nanticoke, Pa. The deceased was a native of Poland, and had a Hungarian named John Giphie laboring for him. Neither of the two could speak English, nor could they converse intelligibly with each other. They were working on the night shift, and another party were working in the second chamber from them. About seven, P. M., Sulkofski went under the top bench and a slab of rock fell on him, knocking him down under it, the laborer, unexperienced and frightened, ran out without waiting to look what had happened, nor made he any effort to acquaint any one of the accident until he arrived in his boarding-house. He passed the drivers not far from the chamber and others again at the mouth of the tunnel. At his boarding-house he succeeded to make a Polish woman understand that the miner was under a fall of roof in the chamber, and she hurried to another woman who could understand a little of the Polish language and told her. The latter immediately found parties to go and rescue the miner who had been so cowardly deserted by his fellow-workman. The drivers, whom they met on their way, soon led them to the chamber, but too late to save the unfortunate man's life. He was lying under a slab of rock, about four inches thick, which was instantly removed by two boys before the men had quite reached the spot. The stone laid on his body, leaving his arms and legs free, and the appearance of the culm and dirt around him indicated that he had been struggling hard to relieve himself. He undoubtedly was stifled by the continuous pressure of the stone on his body. The rescuing party were unanimous in their opinion that the laborer could have saved his life if he had tried instead of running away. The workmen, and with good reason, were bitterly incensed at the action of the cowardly laborer, and openly censured their employers for allowing men who cannot be informed of their duties to work underground, especially as miners or laborers. Sulkofski left a widow and three children.

ACCIDENT No. 8.—Howard Geibertson, a laborer, age nineteen years, was instantly killed, at the Washington colliery, Plymouth, August 14. He was working with a man named George W. Alter, and both were working on this day, preparing coal for next day. The mine was not working.

They were up from the gangway about six hundred feet, on a pitch of eighteen degrees, and were drawing back, or robbing some coal that was left by driving the chamber up. The fire boss, John Walters, passed through their chamber, and called their attention to a suspicious looking part of the roof, and cautioned them to be careful not to go under it, fearing it would fall. It was about twenty feet high, and difficult to reach, even to sound it; but they did sound it, and thought there was no danger of its falling. After firing one blast, the miner fixed his ladder against the pillar, and went upon it to drill another hole. The deceased stood close to the rib, about ten feet above him, and in a safe place. While they were there the coal on the pillar cracked a little, and the laborer, thinking the coal was going to fall off the pillar, jumped towards the middle of the chamber, and simultaneously a large slab of rock fell on him, killing him instantly. The ladder was crushed under the miner, and he was precipitated many feet down the chamber, but he escaped without receiving any injury.

Accident No. 13.—Patrick Kelley, a miner, age twenty-six years, killed by barring roof down at the Enterprise colliery, September 20. I passed through all the working places in this colliery September 9, and had then noticed the danger at this place, and called Kelley's attention to it. He was then just beginning to open his chamber from the gangway, and the roof was of a very dangerous character. The timbers were supported on one side by a leg or post, and on the other by a hitch in the side; what is known by miners as "post and bar timbering." The roof was of a very dangerous slate, full of seams and slants. Overlying the coal seam there were two tiers of bone coal, called "rider coal," which is taken down only when that is necessary in order to gain height enough to load the cars. The upper tier was twelve inches, and the lower one nine inches thick; and the end of the collars, or timber, rested in holes cut for that purpose, in the top of the rider coal. I cautioned Kelley that he should not trust that the "rider" would sustain the collars, and that he should be sure to put props under them before blasting the coal away. And he did so, under the collars opposite the chamber, but left the one on the right corner as it was, without a prop to sustain it—it probably appeared to have a hold on the solid coal. When the chamber was driven on about ten yards from the gangway, the vein got too thin to give the requisite height, and he concluded to pull down a part of the "rider coal," and went at it by first knocking out two props he had placed under it, and then went back to the gangway, with the evident intention of pulling it all down from there to the face of the chamber. He stood on the gangway, nearly under the collar which was supported by the coal, and barred down a piece of the lower tier of the rider coal, and, at the same time, the collar on his right, and a mass of rock fell on him, killing him instantly. When I examined the place, after the accident, a smooth parting was exposed, revealing that the fallen collar had had but a very meager support, and it was a sad mistake to bar down the very part which appeared to support the collar, without first putting a prop under it.

ACCIDENT No. 17.—James Tolan, a laborer, age thirty years, was fatally injured by a fall of slate at No. 1 shaft, Kingston, Pennsylvania, November 1, and died immediately after he was taken home. The miner with whom he was laboring was not in work that day, and Tolan, who had had some experience in mining at other mines, fired a blast to get coal. Immediately after firing the shot, he returned to load his car, without examining the place, and ascertain if there was any loose coal or slate left in danger of falling, as he ought to have done. The roof over the vein was very strong and safe, but on top of the vein there was a tier of slate, which always came down with the coal, and a piece of this was left hanging after the shot. While Tolan was loading his car, that fell on him, with the result already stated.

ACCIDENT No. 20.—William Kitchen, a miner, age thirty years, was fatally injured, November 22, by a fall of fire-clay at the Hartford colliery, and died from the effects of his injuries, November 29.

The chamber in which the deceased worked was driven a distance of about forty feet from the gangway, and, to all appearance, very safe. In most places through this mine, the fire-clay came down with the coal, but here, in Kitchen's chamber, it adhered to the top coal, and had to be separately blasted down. The deceased had fired two holes in the bottom coal, and was drilling a third one, not suspecting any danger, when, without a moment's warning, a piece of the fire-clay fell on him, injuring him very severely, and finally ended in his death. He was married, but had no children.

Fatal Accidents by Cars.

This has been a prolific cause of accidents during the last six months, and most of them are evidently the result of carelessness on the part of the victims themselves. Many accidents of this class could certainly be averted if all the foremen should exercise a good, strict discipline in and around the mines. Too much freedom is generally allowed to the boys, who are naturally inconsiderate, adventurous, and full of mischief, and, unless prevented, will often run a fearful risk altogether unnecessary.

ACCIDENT No. 5.—John Jennings, a footman, age fifty-five years, was fatally injured by cars, at the foot of the underground slope, Nottingham colliery, August 3. Was taken directly to the hospital at Wilkes-Barre, where an amputation of one of his legs was performed, with the hope of saving his life, but he failed to survive the shock, and died August 5. Until recently, he was employed as a company laborer, and, at his own request, was placed to attend the foot of the slope. He was much gratified by the change, believing the work of a footman to be easier and more pleasing. The branches at the bottom of the slope are arranged so that the cars can be taken out from two separate gangways, which are diverging from the angle of the slope. The deceased had been sending up some cars from the right or west gangway, and expected to send the next trip from the other or east gangway, but neglected to turn the switch for that branch. Having overlooked that, he stood in a contemplative manner on the west track, expecting the trip to pass on the other, when suddenly the cars rushed upon him, dragging him along for several yards. He was taken up immediately, by parties who were close by, but his leg was broken and the flesh shockingly lacerated around the knee. What followed is already stated.

This evidently was a case where a human life was lost through absent-mindedness. While, apparently, to place a man of his habits and ripe age, at the said work, was an act of kindness, it proved a sad mistake. Old men, and men of contemplative habits, should not be entrusted to do work of this kind, as it requires quick movements, and presence of mind at all times. He was married, but his children were all fully grown.

Accident No. 6.—William J. Warren, a driver on the culm dump, age fifteen years, was instantly killed at No. 2 shaft, Plymouth, August 4.

He was making one of his usual trips to the dump, with a loaded culm car. John Nesbit was on the hind end, attending to the brake, and John Warren, the deceased's brother, was riding on the side of the car. When about half way to the dump, Willie struck the mule with his whip, and started him on faster, then he attempted to step on the front end of car, and missed his hold, fell under, and was instantly killed.

Accident No. 11.—Thomas Judge, a miner, age forty-five years, killed by the mine locomotive, at Exeter shaft, West Pittston, Pennsylvania, September 11. The deceased had gone about fifty yards from the foot of the shaft, on his way into the mine, in the morning, when the mine locomotive started after him in the same direction. He, for some reason, did not turn out of its way, and was almost instantly killed. The locomotive engineer blew the alarm whistle before starting, and there was plenty of room to get out of the way; another track ran along parallel with the one he was on, and he could have moved ten feet away on that side, but in his confusion, it appears that he attempted to step to the wrong side, and was caught between the engine and side. The engineer felt something under the engine, and instantly stopped to see what was wrong. He found Judge jammed between the engine and the side, with his drill bent across his neck. He lived about two hours, and expired. He was married, but had no children.

Accident No. 12.—Samuel Parks, a tracklayer helper, age twenty-eight years, was fatally injured at Mineral Spring colliery, September 17, and died within six hours after the accident occurred. A number of the drivers of this mine were gone on an excursion, and the deceased was employed to drive for this day on a run which had a grade of eleven degrees, and a wooden track. He had taken an empty trip in, and was before a car assisting a miner to let it down to a platform. The wheels were all spragged; but they failed to stop it; and when opposite the second platform he jumped away from the front of the car, and was instantly caught between it and the platform. If he had stayed where he was, as the other man did, for ten feet further, the grade became much less, and the car would stop itself. It was one of many accidents which occur through a lack of coolness. An excited person often commits fatal mistakes, and he (Parks) jumped from a comparatively safe situation into a fatal trap. He was a man well respected, of exemplary character, and enjoyed the confidence and good will of all that knew him. His parents resided in Philadelphia, and his remains were taken thither to be interred.

ACCIDENT No. 15.—Edward Hurst, age seventeen years, was instantly killed, near the head of No. 2 shaft, Kingston, Pennsylvania, October 20.

The breaker belonging to this shaft is quite a distance away, and the cars are hauled by a small locomotive; the culm cars are hauled by the same power to the dump, which is near the shaft. The deceased was employed to assist the locomotive engineer, by coupling and uncoupling cars, and turning switches, &c. When the accident occurred, four loaded culm cars were attached to a trip of empty mine cars, and were brought together to a point near the shaft, where they had to be separated. Here there was a small grade, barely enough for the cars to run by their own gravity. The engineer retarded the speed of the locomotive until Hurst uncoupled the culm cars, and gave the signal to go on. He (Hurst) stayed on the front end of the detached culm cars, which were moving forward slowly, and he made an attempt to step across to the other side, but slipped, and was instantly thrown down on his side across the rail. The front wheel of the first car crossed over his body, and got off the track. He was at once taken out by a man who was a witness to it all, but he only breathed two or three times, and expired.

ACCIDENT No. 18.—Charles Gallagher, a laborer, age sixty years, was crushed to death between railroad cars, near the Empire breaker, November 8. This accident is not strictly a mine accident. The deceased, just after quitting his work, was on his way home, near the lump coal chute of the breaker, and attempted to cross between the railroad cars, where they were apart from three to four feet. The locomotive was then in the act of backing up the cars, and the deceased was caught between the jammers and instantly killed. He was a widower, and left seven children, some of whom were full grown.

ACCIDENT No. 19.—Abel Roberts, plane footman, age twenty-one years, was instantly killed at the Hollenback shaft, November 12.

The plane, where the accident occurred, was driven for the double purpose of (1) effecting a second opening, and (2) to open counter-gangways from it to work the upper lifts of that section. It is thirteen hundred odd feet in length, and has an average grade of twelve degrees. Directly at the top is the air-shaft, three hundred odd feet in depth. The engine is located on top of the air-shaft, and hauls the empty cars up to the several lifts, and lets the loaded ones down. The rope is about two thousand feet long, and is passed over pulley wheels at the top and bottom of the air-shaft.

The mine boss noticed a defective spot in the rope, and, as he stated to me, notified the master mechanic and the splicer of the fact, with a request to have it immediately repaired. However, it was not repaired that day, and the next day, when a loaded trip was up about three hundred feet, the rope broke. The deceased was in the act of coupling cars at the bottom of the plane, when the cars rushed upon him, with the result stated. His mangled remains were the only legacy left for a poor widowed mother, who had depended on him for her and her children's support.

Mine officials, if they can with reasonable propriety, are very prompt in ascribing accidents to the carelessness of the victims of the accidents, but in many instances the lives of workmen are jeopardized by the indifference of those having charge of the various appliances upon which the lives of the workmen depend.

This is a case where the danger of a defective rope was indifferently looked upon, and a young man's life lost as the result. Comments are unnecessary, for the facts of the case plainly indicate whose carelessness was the cause of it, and it should teach a lesson to indifferent officials hereafter.

Accident No. 21.—Thomas McGlynn, a driver, age sixteen years, was fatally injured at the Diamond shaft, November 29. He was walking out carelessly on the gangway, along with his mule and a loaded trip of cars, and thoughtlessly set his foot between a latch and rail, his foot was caught fast, and he failed to release it until the cars came upon him; they crushed his leg fearfully, between his foot and knee. Hopes were entertained of saving his life by amputating the limb, but the surgeons had scarcely finished the operation when he expired.

Accident No. 22.—James Danahey, a driver, age sixteen years, was almost instantly killed at shaft No. 2, Nanticoke, December 11. The deceased, against all instructions to the contrary, undertook to run a loaded car down from a counter-gangway by a brake. To do this, he was obliged to stand on the front end of the car, as the lever of the brake was on that end. The brake proved to be a bad one, and the car ran pretty fast, and when near the bottom of the run it jumped off the track, and threw the driver against a prop with such force as to fracture his skull just above the temple, causing immediate death.

Joseph Warne, the mine boss, stated that on the day before he had caught him running a car, and then charged him not to do so afterwards, for he considered it too dangerous for a boy of his light weight, and had employed a runner especially for that work. Danahey, in return, promised not to do so after. But he was an active boy, ambitious, and anxious to earn more wages, and had asked several times for the job of running cars, which was refused to him on the ground stated.

On the fatal morning, when about to start with the car, another boy told him to be careful, and that he feared the brake was not in order, and he replied that he would risk it. He did, and sacrificed his young life in the attempt.

Accident No. 23.—John Dunstan, a driver, age fourteen years, was killed at shaft No. 2, Nanticoke, December 21. He had just pulled an empty car up into a chamber, which was pitching about four degrees; was leading his mule back, and the trace chain caught in the corner of the car, jerking it over the block. The same time the mule swung against the boy, and knocked him down on the track. The laborer, who stood by, held the car almost instantly, but as the boy was rising he received a thrust in his side, which caused his death in a few minutes.

This was a very unfortunate accident, occurring in a very safe place, and which could have been easily avoided with little care, as there was plenty of room to pass the mule without touching the car.

Fatal Accidents by Premature Blasts.

ACCIDENT No. 2.—Jacob Bossard, a miner, age forty-eight years, was fatally injured, July 28, at the Diamond shaft, near Wilkes-Barre, Pennsylvania, and died July 30. He was working on the eleven, P. M., shift, driving a cross-cut from the airway towards the gangway, and had driven it about six feet from the corner. He and the laborer were both together, and had prepared a hole ready to fire, but before either had moved, the shot went off and injured Bossard very severely about his head, which caused his death at the time stated. I learned that he used patent touch squibs, and was in the habit of cutting the match a little shorter; he might have done that at the time of the accident, but even if he did, it should give him time to retreat.

There must be something wrong with this kind of squibs, for I have heard a number of persons stating that they occasionally go off instantly. And the squib, this time, exploded the blast immediately when it was lighted, and before the men had moved.

The deceased had had a large experience in mining, and was a very careful man. He was married, and had eight children.

ACCIDENT No. 9.—John Manson, a miner, age thirty-five years, was killed by a premature blast, at Sugar Notch slope, August 18. He was driving a cross-cut from the gangway toward the airway, which was quite a distance away, and there was a pitch of about twenty-five degrees. The cross-cut was up thirty-five feet, and the deceased's brother was working with him. They charged a hole ready to blast, and the brother took the tools out of the way down to the gangway, then the miner shouted "fire"—the usual alarm before blasting—and simultaneously with the shout, the blast exploded. His brother ran back and found him on the platform dying. He, too, was using the patent touch squibs, and his death can, with very good reason, be ascribed to one of those defective squibs. The deceased was a native of Switzerland, and left a widow with two children.

Fatal Accidents by falling down shafts.

ACCIDENT No. 7.—Walter Hawk, leader of shift, age thirty-five years, was instantly killed at Forty Fort shaft, August 12. They were sinking this shaft down from the Bennett vein towards the Ross vein, and were below the former about seventy feet. During the first three days of each week they were hoisting coal for eight hours of each day from the Bennett vein, and were sinking the shaft during the other sixteen hours, but for the last three days of the week no coal was raised, and three shifts were employed sinking the shaft. The deceased was leader of the morning shift, and about eleven. A. M., they concluded to eat dinner. There were ten men working, and five went up first, and the other five got on the next bucket and signaled to hoist. The engineer usually after suspending the bucket stopped to give the men time to steady it, and he did so now, but they signaled the second time without taking time to steady the bucket. As they were ascending the bucket was turning and swaying until they reached that part where the shaft was timbered, and here the bucket struck against a bunting and knocked Hawk off down into the shaft; he grabbed one of the other men, but fortunately that one fell into the bucket and escaped with slight injury. Hawk was instantly killed, and it is suprising that all of them did not share the same fate, and probably would if the engineer had not noticed the rope shaking and stopped the engine. This accident was the result of a reckless adventure which had not a shadow of reason to justify it. The deceased had a wife and four children.

Accident No. 16.—Andrew Brehue, a laborer, age about twenty-six years, was killed at No. 5 shaft, Plymouth, Pa., October 20. This mine was idle that afternoon, had stopped to pay the workman, and nearly all of which were out around the office. A party of men were engaged tarring the shaft ropes, which made it necessary to hoist them out of the shaft slowly. It is supposed that the deceased got on the cage at the bottom without giving the usual signal, and ascended as far as the cooper vein landing, sixty-five feet from the bottom, and during a momentary stop of the cage stepped off there. However when the ropes were tarred the blacksmith went down to repair the signal wire, and as he passed the said landing saw a man waiving his hand on him to stop. The blacksmith could not make the engineer understand where to stop unless he would go up again and tell him. He went up and informed the engineer then descended again, and before he reached the cooper vein he heard something falling down the shaft, he feared at once that it was the man, and got help to go to the bottom, and they found him there dying. The probability is that he attempted to board the ascending cage opposite the one the blacksmith descended on, missed and fell down the shaft. He was a native of Hungary and could not understand a word of English. He had only worked a few days in this mine, and there were none there who could explain anything to him. On the day before the accident occurred he attempted to board the cage when it was starting from the bottom, and would then have been killed if the by-standers had not saved him. His remains were taken home to his wife, but no explanation could then be given to her about his death as nobody could talk the language she understood. The officials of the company saw to it that he received a respectable burial and gave material assistance to the bereaved widow.

Accident No. 24.—Samuel McLean, a laborer, age twenty-two years, was killed at the Albright shaft December 31. He was sending an ash car from the surface landing to the one on a level with the trestling leading to the breaker. He pushed the car upon the cage, signaled to hoist, and when the cage began to ascend threw the fans back and attempted to jump on with the car, missed, and fell back into the shaft, a depth of one hundred and sixty feet. The footman found him immediately, but he was dead. This was no better than committing suicide, and it is surprising that any man would attempt such a thing, unless he had that in view, but he evidently made the fatal leap to save walking a little distance to reach the top of the trestling, from which the ashes were to be dumped.

Fatal Accidents from Explosion of Gas.

ACCIDENT No. 10.—Benjamin Odjers, a miner, age thirty-five years, and John Dagnon, fire-boss, were burned by an explosion of gas at No. 1 slope, Nanticoke, September 2. The former died of his injuries September 10. In my investigation of the accident, September 4, the testimony elicited points directly to the fire-boss as the one responsible for this unfortunate explosion, and that it occurred through his gross carelessness, and almost criminal indifference to danger. Everywhere through this mine indications of careless management were to be seen. The chamber where the explosion occurred was driven thirty-five yards past the upper cross-cut, on a pitch of nearly twenty degrees. The air, of which there was but a small quantity, was conducted from the cross-cut to the face by board brattice. They were working a double shift in nearly all the chambers in that vicinity, and during the night before the accident an explosion occurred in Fisher's chamber, which broke the brattice nearly all down. Consequently, when the fire-boss made his usual examination next morning, he found the face of that chamber full of gas, and work in it was suspended until the brattice could be rebuilt and the gas removed. The fire-boss, sometime in the forenoon, was there rebuilding the brattice, and Odjers was working in the next place on the right of him. A cross-cut was driven from the latter's chamber during the night before, and was almost through into the one where the gas was. In fact, a shot blowed through and exploded some gas when the brattice was broke. To explain hcw the explosion which caused the accident to the men happened, their own statement shall suffice:

Statement of John Dagnon.

"I was employed as a fire-boss in Slope No. 1, Susquehanna Coal Company, until September 2, and was burned with another man named Odjers, in Fisher's chamber, on that date. They were driving a cross-cut from Odjers' chamber into Fisher's, and the Polander had blown through during the night before and exploded some gas, which broke the brattice all down. I was there rebuilding the brattice, and Odjers came over and we went up to see where the cross-cut was coming through. I led the way up, and he followed me. When up by the place I told him not to go further, that there was gas there. I turned round to come back, and was down about five yards, when the gas went off (exploded.) Cannot say from whose lamp it ignited. I carried naked light and a safety-lamp."

Statement of Odjers.

My name is Ben Odjers. Was working in No. 1 slope until September 2. I had fired one shot that morning, when the fire-boss came to my chamber and told me the cross-cut was cracked through into Fisher's chamber. He then asked me to go over with him and see where it was coming through. I at first refused to go, saying I would drill another hole and fire it, which would knock it through. But he asked me again, and said, he had been up there twice that morning. Then I went with him. He went up first and I followed him. When we were up to where the cross-cut was coming through, we stopped, and he showed me where the last hole had cracked through, and he was telling me to put the next hole in a certain way, when just then the gas went off and burned us both. He had more clothes on than I, and I am burned worse than him on that account. The brattice was broken down during the previous night, and the fire-boss was there rebuilding it. We both carried naked lights.

Both men were suffering so much from their burns, when I visited them, that talking seemed painful and difficult, and I did not deem it prudent to extend my interrogations. Enough was disclosed to justify my remarks concerning the carelessness of the fire-boss, and to demonstrate his utter unfitness for such an important position. When I investigated this accident, a new fire-boss was engaged, and soon after the mine boss was superseded by another, who was thought to be more competent, and better qualified to improve things generally. Certainly he had room for improvement.

Odjers was married, but had no children.

Fatal Accident by Miscellaneous Causes.

Accident No. 14.—Owen Sweeney, a slate-picker, age sixty-six years, was killed at Breaker No. 2, Kingston Coal Co., October 16. At the time the accident occurred, the deceased was helping David Francis, the assistant breaker-boss, to remove the grate-bars from the steamboat coal chute. While this was being done they could not dump coal to the breaker. Francis was a man of very hasty, excitable temperament, and exceedingly so when the work was delayed. He jumped on to the bars himself, and handed them indiscriminately, without looking by whom they were received, or where they stood who received them from him. He had, naturally, communicated his hasty movements into his assistants. The deceased, to be convenient to receive them out of Francis' hands, had gone over the railings which had been placed there to guard an open space, directly over a pair of revolving cast-iron screens, and from there he fell, a distance of about twelve feet, and upon the revolving screens. One of the boys saw him falling, and instantly gave alarm; but before he could be released, he had received injuries which caused his death in a few minutes. The deceased left an aged widow and four children.

TABLE NO. II.—*A list of accidents not proving fatal in the Middle District of*

DATE.	No.	NAMES OF PERSONS INJURED.	Age.	NAMES OF COLLIERIES.
July 19	1	James McGlynn,	19	No. 9, Sugar Notch,
19	2	Nelson Mapfield,	16	Mill Creek slope,
20	3	Gomer Lewis,	17	Tunnel No. 1, Nanticoke,
21	4	Thomas Hill,	40	Shaft No. 1, Nanticoke,
25	5	Cornelius McCobe,	26	Baltimore tunnel,
23	6	James Kenney,	. .	Pine Ridge shaft,
30	7	Patrick Welsh,	23	Midvail colliery,
31	8	Lewis Griffiths,	40	Grand tunnel,
Aug. 3	9	John Duffey,	14	Enterprise,
6	10	Charles Miller,	23	Slope No. 2, Nanticoke,
9	11	Hugh Jones,	35	No. 9, Sugar Notch,
9	12	Benjamin R. Jones,	26	Shaft No. 1, Nanticoke,
9	13	William Nork,	28	Shaft No. 2, Nanticoke,
9	14	Richard Britt,	16	Boston Mines,
9	15	Walter Price,	20	Enterprise,
11	16	Patrick Davitt,	. . .	Pine Ridge shaft,
11	17	William E. Lewis,	32	Avondale,
13	18	Frank Herman,	. . .	Baltimore slope,
13	19	David W. Davies,	14	Slope No. 2, Nanticoke,
16	20	James Keating,	20	No. 4, Plymouth,
16	21	Daniel H. Thomas,	25	Honey Pot, Nanticoke,
16	22	John Hughes,	22	Slope No. 1, S. Coal Company,
16	23	William Howard,	34	Enterprise,
18	24	Albert Krolinski,	50	No. 3, Nanticoke,
24	25	John D. Tighe,	39	Exeter,
21	26	Patrick Heffron,	13	Enterprise,
25	27	David H. Davies,	45	Slope No. 2, Nanticoke,
27	28	Peter Mylinger,	30	Prospect,
30	29	John McCarty,	35	Brown slope, F. Coal Company,
31	30	David J. Williams,	72	Nottingham,
31	31	Thomas McDonald,	35	Breaker No. 5, Nanticoke,
Sept. 2	32	John Dagnon,	30	Slope No. 1, Nanticoke,
4	33	Jacob A. Morgan,	30	Shaft No. 2, Nanticoke,
4	34	Irving Minnick,	19	No. 9, Sugar Notch,
4	35	James Brislin,	27	Hartford,
6	36	Simon Marazoni,	25	Tunnel No. 1, Nanticoke,
6	37	John Hughes,	14	Old slope, Franklin,
7	38	James Hines,	38	Shaft No. 2, Kingston,
8	39	Michael Murphy,	30	Prospect colliery,
10	40	Joseph Rawling,	40	Pine Ridge,
10	41	John Pritchard,	15	No. 11, Plymouth,
10	42	Leo Dutsch,	13	Hollenback,
10	43	Benjamin Davies,	25	Shaft No. 2, Kingston,
10	44	Thomas Tamblyn,	. . .	Baltimore slope,
11	45	John Langdon,	14	Shaft No. 2, Kingston,
11	46	Richard Lloyd,	29	Nottingham shaft,
13	47	William Devlin,	17	Henry colliery,
13	48	William Lawlor,	. .	Laurel Run,
14	49	Michael Dooley,	. . .	Enterprise,
14	50	Michael Sweeney,	. .	Enterprise,
15	51	Patrick Finley,	50	No. 3, West Nanticoke,
16	52	Thomas A. Jones,	35	Shaft No. 2, Nanticoke,
16	53	Joseph Weiss,	26	Shaft No. 2, Nanticoke,
18	54	David J. Edwards,	28	Empire shaft,
18	55	Thomas L. Jones,	25	Empire shaft,
22	56	Daniel Everett,	.	Laurel Run,
22	57	William R. Powell,	14	Slope No. 2, Nanticoke,
28	58	John T. Corcoran,	14	Shaft No. 2, Nanticoke,
29	59	Daniel Evans,	33	Grand tunnel,
30	60	Michael Leonard,	20	Diamond shaft,
30	61	Henry Skipper,	16	Enterprise colliery,
30	62	Thomas Hughes,	49	Enterprise colliery,
30	63	Henry Howells,	28	Tunnel No. 2, Nanticoke,
30	64	Willie Rees,	14	Gaylord shaft,
Oct. 7	65	George Hum,	30	No. 3, Grand tunnel,
8	66	Morris Caffern,	13	Hollenback shaft,
11	67	John Lally,	14	Hollenback shaft,
12	68	David W. Williams,	40	Diamond shaft,
12	69	Robert Estell,	30	Maltby colliery,
13	70	Thomas Brunatto,	55	Slope No. 1, Nanticoke,
14	71	Charles Tigue,	25	Exeter colliery,

Luzerne and Carbon counties, from July 19 to December 31, 1880, inclusive.

NATURE AND CAUSE OF ACCIDENTS.	Falling of roof and coal.	Explosions of powder and blasts.	Explosions of gas.	By cars underground	Falling down shafts.	Miscellaneous causes inside.	Outside.	Totals.	No.
Arm broken by a car which went over the dump,							1	1	1
Hand fractured between the bumpers of cars,				1				1	2
Slightly injured by a kick from a mule,						1		1	3
Slightly burned by explosion of gas,			1					1	4
Leg broken by a fall of coal,	1							1	5
Two toes broken by a piece of coal which fell on his foot,	1							1	6
Two teeth broken and lip cut by a kick from a mule,						1		1	7
Slightly injured by a premature blast,		1						1	8
Back slightly injured by falling under cars,				1				1	9
Slightly injured by a fall of rock in gangway,	1							1	10
Severely burned by explosion of keg of powder,		1						1	11
Slightly injured by falling timber,						1		1	12
Slightly burned by explosion of gas,			1					1	13
Leg crushed by falling under loaded cars,				1				1	14
Injured by coal falling from the pillar,	1							1	15
Burned by explosion of a powder cartridge,		1						1	16
Slightly injured by a premature blast,		1						1	17
Slightly injured by a fall of rider coal,	1							1	18
Slightly jammed between car and prop,				1				1	19
Leg bruised by a fragment of coal falling from pillar,	1							1	20
Slightly injured between car and pillar,				1				1	21
Leg broken, caught between car and rib,				1				1	22
Leg bruised by a runaway car on slope,				1				1	23
Slightly injured by prop rolling over him in the yard,							1	1	24
Slightly injured by a fall of black rock,	1							1	25
Temple cut and leg bruised by car knocking a door against him,				1				1	26
Ankle injured by him barring coal down on it,	1							1	27
Injured by a fall of roof,	1							1	28
Severely injured by a fall of coal,	1							1	29
Head and ribs squeezed between car and rib,				1				1	30
Hand lacerated by a car running into carriage pit,				1				1	31
Burned by explosion of gas,			1					1	32
Cut on arm by falling coal,	1							1	33
Slightly jammed between car and prop,				1				1	34
Back and leg injured by car running over him,				1				1	35
Ribs broken by a fall of fire-clay,	1							1	36
Thigh severely cut by falling under cars,				1				1	37
Thigh fractured by coal flying from a blast,		1						1	38
Slight cut on head by returning too soon to a blast,		1						1	39
Small bone of leg fractured by a premature blast,		1						1	40
Arm lost by falling under cars,				1				1	41
Teeth knocked out by kick of a mule,						1		1	42
Face badly cut by a fall of slate,	1							1	43
Injured by runaway trip at foot of slope,				1				1	44
Knee squeezed between bumpers of cars,				1				1	45
Slightly injured, caught between cars,				1				1	46
Kicked by a mule on side of his head,						1		1	47
Cut above his eye and bruised about the hips by a fall of coal,	1							1	48
Both were slightly burned by an explosion of gas in an old chamber,			1					1	49
			1					1	50
Cut severely above hip, being struck by a car,				1				1	51
Both slightly burned by an explosion of gas in cross-cut between airway and gangway,			1					1	52
			1					1	53
Severe cuts on thigh by falling under a car,				1				1	54
Cut on his foot by a lump of coal rolling on it,						1		1	55
Back severely bruised by a fall of rider coal,	1							1	56
Slightly injured, being struck by a car which jumped the track,				1				1	57
Slightly injured by a runaway car,				1				1	58
Severely cut on neck by a piece of coal falling,	1							1	59
Arm crushed and amputated, caught between guide and carriage in the shaft,						1		1	60
Hips slightly bruised, caught between car and prop,				1				1	61
Legs slightly bruised by a premature blast,		1						1	62
Slightly injured by a prop falling on him,						1		1	63
Leg fractured, struck by passing cars,				1				1	64
Back slightly injured by a fall of coal,	1							1	65
Two ribs broken by falling from the breaker window,							1	1	66
Collar broken by runaway car on counter gangway,				1				1	67
Slightly injured on back and arm by a premature blast,		1						1	68
Injured on head and back by a fall of coal,	1							1	69
Slightly burned by explosion of gas,			1					1	70
Skull fractured by blast exploding through the pillar from another chamber,		1						1	71

TABLE NO. 2—

DATE.		No.	NAMES OF PERSONS INJURED.	Age.	NAME OF COLLERIES.
Oct.	14	72	Thomas Morgan,	17	Henry colliery,
	15	73	Steven Metzing,	32	Mill Creek slope,
	15	74	Peter Kilger,	..	Mill Creek,
	16	75	David Davies,	10	Gaylord,
	16	76	Pat Cafferty,	25	No. 9, Sugar Notch,
	16	77	Jerry Sexton,	36	Shaft No. 1, Nanticoke,
	20	78	Joseph Pearson,	16	Pine Ridge colliery,
	20	79	William Nork,	28	Shaft No. 1, Nanticoke,
	20	80	Arthur Everett,	11	Laurel Run,
	21	81	Decker Schooley,	...	Maltby,
	22	82	John Hill,	36	Laurel Run,
	22	83	William Dickey,	18	Diamond Breaker,
	23	84	Hamilton Seymour,	23	Shaft No. 2, Nanticoke,
	23	85	Peter Vanwhy,	15	Oak Wood Prospect,
	25	86	Patrick Meehan,	54	Diamond colliery,
	26	87	Samuel Stevenson,	35	Maltby,
	26	88	Essex Williams,	31	Nottingham,
	28	89	David W. Thomas,	45	do.
	28	90	George Irwin,	73	Diamond,
	28	91	John Felts,	37	Hartford, No. 6,
	29	92	William Hamilton,	28	Slope No. 4, Nanticoke,
	29	93	Bernard Fox,	14	Oak Wood Prospect,
	30	94	Thomas J. O. Malley,	28	Forty Fort,
Nov.	1	95	Joseph Turner,	...	Shaft No. 1, Nanticoke,
	1	96	Charles Willis,	...	do. do.
	1	97	William Donnegan,	...	do. do.
	1	98	Joseph Seignor,	...	do. do.
	1	99	Thomas Atkins,	17	Mill Creek slope,
	4	100	Michael Black,	60	Franklin,
	4	101	George Galitely,	26	Mineral Spring,
	4	102	Charles Bamrick,	30	Diamond shaft,
	4	103	David H. Thomas,	24	do.
	4	104	John H. Thomas,	35	do.
	4	105	John M. Williams,	25	do.
	4	106	Charles Williams,	20	do.
	4	107	Thomas F. Jones,	24	do.
	5	108	Andrew Martin,	28	Enterprise,
	12	109	James Ralston,	13	do.
	13	110	Napoleon Davies,	...	Mill Creek slope,
	13	111	Patrick Welsh,	...	Slope No. 1, Nanticoke,
	15	112	William Morgan,	16	Boston mines,
	19	113	David W. Evans,	...	Slope No. 4, Nanticoke,
	19	114	William J. Thomas,	...	do. do.
	20	115	Anthony Lavin,	11	Laurel Run Breaker,
	23	116	Michael Holland,	14	Franklin colliery,
	24	117	Patrick McNally,	30	Exeter shaft,
	26	118	Dudley Gallagher,	35	Hutchinson colliery,
	26	119	Thomas Sweeney,	35	Hutchinson,
	26	120	Thomas Hopkins,	68	Nottingham shaft,
	29	121	James Young,	41	Dodson colliery,
	30	122	Michael Moore,	15	Wyoming shaft,
Dec.	1	123	Hugh Reel,	45	Baltimore Tunnel,
	5	124	James Bell,	65	No. 7, Fan House,
	7	125	Benjamin Hoover,	14	East Boston,
	10	126	Charles Humphreys,	24	Nottingham,
	11	127	John Bowman,	50	Sugar Notch, No. 9,
	13	128	Abram Davies,	25	Hollenback shaft,
	21	129	Thomas McGuire,	...	Mill Creek slope,
	27	130	John Batzley,	18	Hollenback shaft,
	27	131	John Kinney,	53	No. 5 Plymouth,

Continued.

NATURE AND CAUSES OF ACCIDENTS.	Falling of roof and coal.	Explosions of powder and blasts.	Explosion of gas.	By cars underground.	Falling down shafts.	Miscellaneous causes inside.	Outside.	Totals.	No.
Leg severely crushed by falling under a car. His foot caught in the latch, throwing him down,				1				1	72
Arm broken by falling while running from a blast,						1		1	73
Thigh bruised by a kick from a mule,						1		1	74
Arm fractured; clothing caught in a shaft in the breaker, winding him around with it,							1	1	75
Face and hands slightly burned by explosion of gas,			1					1	76
Slightly injured by a blast. Cut the match short,		1						1	77
Shoulder bone broken, being crushed between car and side of gangway,				1				1	78
Ankle sprained by a fall of rock from side,	1							1	79
Two fingers crushed between the screen and plank,							1	1	80
Chest injured; squeezed between the cage and beam; caught by attempting to jump out too soon,						1		1	81
Shoulder and hips bruised by a fall of rider coal,	1							1	82
Arm bruised; caught between top of car and chute,							1	1	83
Foot crushed by a runaway car; brake broke while he was on,				1				1	84
Leg broken; loaded trip jumped the track near foot of slope and caught him,				1				1	85
Leg broken near the ankle by a fall of blacksmith coal,	1							1	86
Leg broken; was holding a car while the mule was passing; trace chain caught and pulled the car upon him,				1				1	87
Severely injured by a fall of top coal,	1							1	88
Leg broken near ankle; caught between two pieces of timbers,						1		1	89
Ribs fractured; being struck by a culm car,							1	1	90
Leg slightly injured by coal running from chute,						1		1	91
Leg broken by collision of cars near head of slope,							1	1	92
Hip bruised; caught between car and prop,				1				1	93
Leg broken and scalp lacerated by a fall of roof,	1							1	94
Knee broken. These men, with six others, were on the cage descending the shaft, when the fans of the upper lift happened to be closed, and stopped the cage unexpectedly, causing the injuries stated,									95
Knee broken.									96
Knee broken.									97
Back injured.						4		4	98
Ribs broken and otherwise injured; caught between the car and roof,				1				1	99
Leg broken by a lump of coal rolling on it,						1		1	100
Hip broken and otherwise injured by a fall of roof,	1							1	101
These six men were burned by explosion of gas. They were working together driving a tunnel, and the parties on the previous shift had just blasted a round of holes, which had tapped a blower of gas. When these men came to relieve the other shift, they went on to the face of the tunnel, and an explosion occurred, which burned these six men slightly,									102
									103
									104
									105
									106
			6					6	107
Hand severely cut by a lump of coal which broke in his hands,						1		1	108
Leg broken by falling under cars while trying to pass them,				1				1	109
Leg bruised; caught between door post and car,				1				1	110
Arm fractured by fall of roof,	1							1	111
Severely injured; his clothing caught in the trace of his mule, which was frightened, ran dragging the boy for some distance, with the result stated,							1	1	112
Burned by an explosion of gas, in an old chamber,									113
			2					2	114
Leg broken in two places by sliding on the breaker roof,							1	1	115
Leg crushed under cars, had to be amputated,				1				1	116
Slightly injured by a fall of roof,	1							1	117
Leg broken. Both injured by a fall of roof,	1							1	118
Small bone of arm broken.	1							1	119
Slightly injured; struck by a door while riding on a car,						1		1	120
Nose broken by a premature blast,		1						1	121
Heel crushed; foot caught in a frog and car ran over it,				1				1	122
Leg and arm broken by a fall of coal from rib,	1							1	123
Burned by explosion of gas, which ignited from the stove in the fan house,			1					1	124
Squeezed between car and rib severely injured,				1				1	125
Slightly injured by a fall of slate,	1							1	126
Slightly injured by a premature blast,		1						1	127
Face and hands burned by an explosion of gas,			1					1	128
Slightly burned by an explosion of gas,			1					1	129
Leg terribly mangled by falling under cars,				1				1	130
Seriously injured by a fall of coal,	1							1	131
Totals,	31	13	20	37	. .	20	10	131	

TABLE NO. III.—*A list of accidents proving fatal in the Middle Disirict of*

DATE.	Number.	NAMES OF PERSONS KILLED.	Age.	Widows.	Orphans.	NAMES OF COLLIERIES.
July 28	1	Patrick Bolger,	60	1	8	Hartford colliery,
28	2	Isaac Withey,	36	...	3	Shaft No. 2, Nanticoke,
28	3	Jacob Bossard,	48	1	5	Diamond shaft,
31	4	John Sulkofshi,	36	1	..	Tunnel No. 2, Nanticoke,
Aug. 3	5	John Jennings,	55	1	...	Nottingham shaft,
4	6	William J. Warren,	15	...	...	Shaft No. 2, Plymouth,
12	7	Walter Hawk,	35	1	4	Forty Fort shaft,
13	8	Howard Gelbertson,	19	...	...	Washington colliery,
18	9	John Manson,	35	1	2	No. 10, Sugar Notch,
Sept. 2	10	Benjamin Odgers,	35	1	...	Slope No. 1, Nanticoke,
11	11	Thomas Judge,	45	1	...	Exeter colliery,
17	12	Samuel Parks,	28	...	...	Mineral Springs,
29	13	Patrick Kelley,	26	...	...	Exterprise colliery,
Oct. 16	14	Owen Sweeney,	66	1	4	Kingston breaker, No. 2,
20	15	Edward Hurst,	17	..	...	Kingston, No. 2,
21	16	Andrew Brehue,	26	1	...	Shaft No. 5, Plymouth,
Nov. 1	17	James Tolan,	30	...	..	Shaft No. 1, Kingston,
8	18	Charles Gallagher,	60	.	7	Empire breaker,
19	19	Abel Roberts,	21	..	...	Hollenback shaft,
22	20	William Kitchen,	30	1	...	Hartford colliery,
23	21	Thomas McGlynn,	16	..	...	Diamond shaft,
Dec. 4	22	Stewart Lysle,	14	..	...	Poole's colliery,
11	23	James Danahey,	16	...	...	Shaft No. 2, Nanticoke,
21	24	John Dunstan,	14	...	.	Shaft No. 2, Nanticoke,
31	25	George Cramer,	22	...	...	Albright Coal Company's shaft,
		Totals,	...	11	36	

Luzerne and Carbon counties, from July 19 to December 31, 1880, inclusively.

Nature and Cause of Accident.	Falls of roof and coal.	Explosion of powder and blasts.	Explosion of gas.	By cars underground.	Falling down shafts.	Miscellaneous causes—inside.	Miscellaneous causes—outside.	Totals.	Number.
Fatally injured by fall of roof; died within two hours,	1							1	1
Fatally injured by fall of roof; died July 30,	1							1	2
Fatally injured by premature blast; died July 30,		1						1	3
Killed by a fall of slate from under top coal,	1							1	4
Fatally injured by cars at foot of slope; died at the Wilkes-Barre hospital, August 5, 1880,				1				1	5
Instantly killed by falling under culm car on the culm dump,				1				1	6
Instantly killed by falling off the bucket into the shaft,					1			1	7
Instantly killed by fall of rock,	1							1	8
Instantly killed by a premature blast,		1						1	9
Severally burned by explosion of gas; died September 10,			1					1	10
Instantly killed by mine locomotive running over him,						1		1	11
Killed by being crushed between car and platform,				1				1	12
Instantly killed by a fall of rock,	1							1	13
Instantly killed by falling on a revolving cast iron screen,							1	1	14
Instantly killed by falling under cars,							1	1	15
Instantly killed by falling down the shaft from cooper vein,					1			1	16
Killed by a fall of roof,	1							1	17
Instantly killed; crushed between railroad cars,							1	1	18
Instantly killed by a runaway trip at foot of plane,				1				1	19
Back severally injured by a fall of slate; died November 29,	1							1	20
Killed; his foot caught between latch and rail and was held until the cars ran over him,				1				1	21
Both legs crushed in the cog wheel of breaker engine; died at the hospital, December 16, 1880,							1	1	22
Instantly killed; caught between a car and prop,				1				1	23
Killed; was thrown down on the track by the mule and the car ran against him and fatally injuring him; died in half an hour,				1				1	24
Instantly killed by falling down the shaft,					1			1	25
Totals,	7	2	1	7	3	1	4	25	

TABLE NO. IV.—*Showing the class of collieries, number of mules and horses employed, number of days worked, number of persons employed, persons injured, and number of persons killed; together with number of tons mined per employé, per life lost, and total tonnage per each colliery, and number of kegs of powder used for all purposes, during 1880.*

LEHIGH VALLEY COAL COMPANY.

NAMES OF THE COLLIERIES.	Class of Colliery.	Number of mules and horses.	Days worked by breaker.	Number of persons employed.	Persons injured.	Persons killed.	Tons of coal mined per employee.	Tons of coal mined per life lost.	Total tons of coal mined during 1880.	Kegs of powder used for all purposes in the mine.
1. Exeter,	Shaft,	70	194.05	480	9	1	652.08	213,000	213,000	6,899
2. Prospect,	Two shafts,	62	185.95	499		1	420.84	210,000	210,000	6,599
3. Mineral Spring,	Slope,	25	173.35	221	11	1	334.61	85,000.04	85,199.04	2,464
4. Midvale,	Slope,	8	157.35	144			305.55	No life lost,	44.000	1,553
5. Henry,	Shaft,	47	201.25	250	22	1	420.28	105,070	105.070	3,251
Total Lehigh Valley Coal Company,		212	182.39	1,594	42	4	412.33	164,317.26	657,269.04	20,766

LEHIGH AND WILKES-BARRE COAL COMPANY.

NAMES OF THE COLLIERIES.	Class of Colliery.	Number of mules and horses.	Days worked by breaker.	Number of persons employed.	Persons injured.	Persons killed.	Tons of coal mined per employee.	Tons of coal mined per life lost.	Total tons of coal mined during 1880.	Kegs of powder used for all purposes in the mine.
6. Diamond,	Shaft,	38	190.50	440	. .	4	471.17	51,829.76	207,319.07	3,814
7. Hollenback,	Shaft,	19	178.75	372	. .	1	257.74	95,881.09	95,881.09	2,505
8. Empire,	Shaft,	58	176.25	711	8	1	319.15	248,250.13	248,250.13	5,272
9. Hartford,	Slopes,	42	184.25	580	.	3	351.16	67,891.71	203,675.15	5,988
10. Sugar Notch, No. 9,	Shaft,	48	178.50	452	. .	. .	287.56	No life lost,	129,981.03	4,228
11. Sugar Notch, No. 10,	Slope,	28	96.25	395	. .	1	163.57	64,612.04	64,612.04	2,708
12. Lance, No. 11,	Shaft,	36	151	259	. .	.	374.65	No life lost,	97,035.09	2,521
13. Nottingham,	Shaft,	74	181.25	738	. .	1	381.12	281,271	281,271	6,520
14. Washington,	Slope,	46	187	331	. .	1	379.81	125,718.10	125,718.10	2,755
15. Wanamie,	Slope,	29	167.50	340	. .	.	261.48	No life lost,	88,905.01	4,173
Total Lehigh and Wilkes-Barre Coal Company,		418	169.125	4,618	8	12	334.05	128,553.97	1,542,647.71	40,484

DELAWARE AND HUDSON CANAL COMPANY.

NAMES OF THE COLLIERIES.	Class of Colliery.	Number of mules and horses.	Days worked by breaker.	Number of persons employed.	Persons injured.	Persons killed.	Tons of coal mined per employee.	Tons of coal mined per life lost.	Total tons of coal mined during 1880.	Kegs of powder used for all purposes in the mine.
16. Mill Creek,	Slope,	45	187.25	361	. .	. .	385.77	No life lost,	139,265.09	Not given.
17. Pine Ridge,	Shaft,	31	193.75	261	7	.	385.38	No life lost,	100,586	Not given.
18. Laurel Run,	Slope,	31	190.50	294	4	. .	423.44	No life lost,	124,493	Not given.

19. Baltimore Slope,	Slope,	26	192.25	245	2	1	441.80	108,242	108,242	Not given.
20. Baltimore Tunnel,	Tunnel,	45	190.50	337	2	. .	431.21	No life lost,	145,219.03	Not given.
21. Conyngham,	Shaft,	9	. . . .	77	1	.	None shipped,	No life lost.	None shipped,	Not given.
22. No. 2 Plymouth,	Shaft,	27	162	292	2	1	279.50	81,614.02	81,614.02	Not given.
23. No. 3 Plymouth,	Shaft,	22	140.75	236	1	. .	355.71	No life lost,	83,948	Not given.
24. No. 4 Plymouth,	Shaft,	18	152.25	247	1	. .	302.98	No life lost,	74,836.18	Not given.
25. No. 5 Plymouth,	Shaft,	52	203.50	385	4	1	451.17	173,901.55	173,901.55	Not given.
Total Delaware and Hudson Canal Company,	. . . .	307	179.19	2,735	24	3	377.36	344,034.95	1,032,104.87	

SUSQUEHANNA COAL COMPANY.

26. Breaker No. 1,	Tunnel, Two slopes, Shaft,	101	256.25	1,282	. .	15	264.15	22,576.61	338,649.15	18,434
27. Breaker No. 5,			208.50							
28. Breaker No. 2,	Tunnel, shaft & slope,	81	255.75	727	.	. .	452.64	. . . .	339,074	
29. West Nanticoke, No. 3,	Tunnel,	34	211.60	288	. .	2	329.11	47,393.17	94,786.35	2,553
Total Susquehanna Coal Company,	. . . .	219	233.025	2,297	. .	17	336.31	45,441.72	772,509.50	20,987

MISCELLANEOUS COMPANIES.

30. Avondale,	Shaft,	34	182	314	2	.	387.17	No life lost,	133,188	3,533
31. Boston,	Shaft,	39	167.20	258	2	1	353.84	91,291	91,291	2,412
32. No. 1 Shaft, Kingston,	Shaft,	28	193.25	222	. .	1	520.95	115,651.09	115,651.09	3,238
33. No. 2 Shaft, Kingston,	Shaft,	36	192	345	. .	2	547.45	94,435.59	188,871.18	4,618
34. Gaylord,	Slope,	38	158.75	240	4	3	336.59	26,927.31	80,782.03	2,750
35. Franklin,	Two slopes,	22	141.25	385	4	2	302.84	58,298.56	116,597.12	2,595¾
36. Wyoming,	Shaft,	41	177	393	. .	1	371.09	145.841	145,841	3,700
37. Forty Fort,	Shaft and tunnel,	32	176	235	. .	2	402.99	47,351.50	94,703	3,400
38. Enterprise,	Shaft,	32	168	292	. .	1	363.40	106.113	106,113	3,703
39. East Boston,	Shaft,	30	150	209	. .	.	444.97	No life lost,	93,000	Unknown.
40. Black Diamond,	Shaft,	30	176.95	263	1	. .	303.84	No life lost,	79,910.01	2,900
41. Maltby,	Two shafts,	38	171	301	6	. .	286.82	No life lost,	86,333	2,950
42. Dodson,	Shaft,	19	148.50	182	. .	. .	264.93	No life lost,	48,219	1,900
43. Red Ash,	Slope,	11	186.90	217	. .	. .	294.93	No life lost,	65,000	2,582
44. Raubville,	Drifts,	11	178	169	. .	. .	284.62	No life lost,	48,102	400
45. Salem,	Drifts,	22	214.50	154	. .	. .	259.74	No life lost,	40,000	1,500
46. Hillman,	Slopes,	15	185.50	126	. .	. .	380.95	No life lost,	48,000	Unknown.
47. Warren Run,	Slope,	20	159.25	267	.	. .	309.66	No life lost,	82,680	2,600
48. Hollenback,	Slope,	7	169.25	67		2	346.11	11,595	23,199	545
49. Chauncey,	Tunnel,	9	. . . .	74	2	. .	227.18	No life lost,	16,811	560
Total miscellaneous companies,	. . . .	514	*173.43	4,743	. .	15	359.32	113,618.82	1,704,282.43	45,916¾

TABLE NO. IV—*Continued.*

RECAPITULATION.

NAMES OF THE COLLIERIES.	Number of mules and horses.	Days worked by breaker.	Number of persons employed.	Persons injured.	Persons killed.	Tons of coal mined per employee.	Tons of coal mined per life lost.	Total tons of coal mined during 1880.	Kegs of powder used for all purposes in the mine.
Lehigh Valley Coal Company,	212	*182.39	1,594		4	413.11	164,317.28	657,269.04	20,766
Lehigh and Wilkes-Barre Coal Company,	418	*169.12	4,618	. .	12	331.89	128,553.97	1,542,647.71	40,484
Delaware and Hudson Canal Company,	307	*179.19	2,735	24	3	375.85	344.034.95	1,032,104.87	
Susquehanna Coal Company,	219	*233.02	2,297	.	17	336.31	45,441.72	772,509.50	20,987
Miscellaneous Coal Companies,	514	*173.43	4,743	. .	15	368.17	113,618.82	1,704,282.43	45,916¾
Grand Total of all Companies,	1,670	*187.43	15,987	. .	50	357.09	111.937.52	5,708,813.55	128,153¾

*Average number of days worked.

TABLE NO. V.—*Showing the number of each class of employés at every Colliery in the district, for the year 1880.*

LEHIGH VALLEY COAL COMPANY.

Name of the Collieries.	Number employed outside.							Number employed inside.							Total employees inside and outside.
	Bosses.	Mechanics.	Head and plate men.	Company men of all classes.	Drivers.	Slate pickers.	Total.	Bosses.	Miners.	Laborers.	Company men of all classes.	Drivers and runners.	Door boys.	Total.	
Exeter,	1	5	9	50	7	55	127	1	130	120	34	48	20	353	480
Prospect,	1	12	8	45	8	50	124	2	107	150	45	53	18	375	499
Mineral Spring,	1	10	9	15	5	48	88	1	57	32	12	26	5	133	221
Midvale,	1	3	3	10	1	28	46	1	29	45	7	13	3	98	144
Henry,	1	5	4	28	1	24	63	1	65	39	18	48	16	187	250
Total, Lehigh Valley Coal Company,	5	35	33	148	22	205	448	6	388	383	116	188	62	1,146	1,594
LEHIGH AND WILKES-BARRE COAL COMPANY.															
Diamond,	1	3	13	81	6	30	134	1	110	80	50	35	30	396	440
Hollenback,	1	5	19	24	3	80	132	1	79	82	43	15	20	240	372
Empire,	1	.....	16	52	4	107	180	1	142	136	108	82	62	531	711
Hartford,	1	14	12	42	8	129	206	3	121	149	47	26	28	374	580
Sugar Notch, No. 9.	2	8	15	25	7	85	142	3	110	105	33	32	27	310	452
Sugar Notch, No. 10,	2	9	8	38	8	60	125	3	100	105	30	17	15	270	395
Lance, No. 11,	1	5	8	12	2	36	64	3	75	50	30	29	8	195	259
Nottingham,	1	12	24	31	2	163	233	6	225	95	80	66	33	505	738
Washington,	1	4	10	18	7	65	105	3	94	45	34	34	16	226	331
Wanamie,	8	7	29	14	5	63	126	3	114	57	12	19	9	214	340
Total, Lehigh and Wilkes-Coal Company,	19	67	154	337	52	818	1,447	27	1,170	904	467	355	248	3,171	4,618
DELAWARE AND HUDSON CANAL COMPANY.															
Mill Creek,	1	6	9	37	5	70	128	2	93	50	20	53	15	233	361
Pine Ridge,	1	3	6	28	2	56	96	1	52	44	24	30	14	165	261
Laurel Run,	1	5	11	25	3	55	100	1	80	42	16	41	14	194	294
Baltimore slope,	1	8	8	21	8	60	106	1	55	30	29	18	6	139	245

TABLE NO. V.—*Continued.*

DELAWARE AND HUDSON CANAL COMPANY—Continued.

NAMES OF THE COLLIERIES.	NUMBER EMPLOYED OUTSIDE.							NUMBER EMPLOYED INSIDE							Total employees inside and outside.
	Bosses.	Mechanics.	Plate and head men.	Company men of all classes.	Drivers.	Slate pickers.	Total.	Bosses.	Miners.	Laborers.	Company men of all classes.	Drivers and runners.	Door boys.	Total.	
Baltimore tunnel,	1	5	6	34	4	70	120	1	71	65	31	35	14	217	337
Conyngham,	1	4	4	23	3	....	35	1	10	20	7	4		42	77
No. 2, Plymouth,	1	6	5	20	3	65	100	1	77	42	32	30	10	192	292
No. 3, Plymouth,	1	6	4	15	1	54	81	1	54	37	29	23	11	155	236
No. 4, Plymouth,	1	6	10	21	2	50	90	1	67	29	21	21	15	157	247
No. 5, Plymouth,	3	6	10	29	2	51	101	2	98	50	53	48	33	284	385
Total, Delaware and Hudson Canal Co.,	12	55	73	253	33	531	957	12	657	409	262	306	132	1,778	2,735

SUSQUEHANNA COAL COMPANY.

NAMES OF THE COLLIERIES.	Bosses.	Mechanics.	Plate and head men.	Company men of all classes.	Drivers.	Slate pickers.	Total.	Bosses.	Miners.	Laborers.	Company men of all classes.	Drivers and runners.	Door boys.	Total.	Total employees inside and outside.
Breakers, Nos. 1 and 5,	3	44	21	99	11	169	347	5	371	350	62	86	61	935	1,282
Breaker, No. 2,	1	30	11	98	5	172	317	3	147	140	54	47	19	410	727
West Nanticoke, No. 3,	1	11	8	33	4	79	136	1	70	38	19	15	9	152	288
Total, Susquehanna Coal Company,	5	85	40	230	20	420	800	9	588	528	135	148	89	1,497	2,297

MISCELLANEOUS COMPANIES.

NAMES OF THE COLLIERIES.	Bosses.	Mechanics.	Plate and head men.	Company men of all classes.	Drivers.	Slate pickers.	Total.	Bosses.	Miners.	Laborers.	Company men of all classes.	Drivers and runners.	Door boys.	Total.	Total employees inside and outside.
Avondale,	1	10	7	19	4	75	116	1	82	86	27	24	8	228	344
Boston,	1	10	8	27	7	40	93	1	56	56	16	27	9	165	258
No. 1 shaft, Kingston,	2	12	4	13	2	42	75	2	50	50	12	26	7	147	222
No. 2 shaft, Kingston,	3	14	9	47	1	62	136	2	81	81	7	29	9	209	345
Gaylord,	1	10	5	12	2	51	81	1	53	59	16	26	13	159	240
Franklin,	1	12	18	93	5	57	186	2	64	66	35	15	17	199	385
Wyoming,	1	9	12	19	5	68	114	1	90	70	47	50	21	279	393
Forty Fort,	1	1	10	34	4	30	80	2	74	21	15	31	9	155	235
Enterprise,	2	6	5	19	4	50	86	2	62	62	40	21	19	200	292
East Boston,	2	3	6	7	4	40	62	2	65	35	8	30	7	147	209

Black Diamond,	3	8	4	18	6	61	100	2	62	45	16	30	8	163	263
Maltby,	2	9	5	33	2	51	102	3	62	62	38	28	6	199	301
Dodson,	1	7	5	25	1	23	62	1	40	25	35	12	7	120	182
Red Ash,	1	3	7	23	2	44	80	1	52	32	32	12	8	137	217
Raubville,	1	3	7	6	4	55	76	1	45	35	2	6	4	93	169
Salem,	1	2	9	7	4	40	63	1	30	40	6	10	4	91	154
Hillman,	1	2	3	12	2	14	34	1	34	40	3	10	4	92	126
Warrior Run,	1	10	9	27	5	50	102	1	75	55	10	10	14	165	267
Hollenback,	1	5	4	4	3	11	28	1	14	14	3	6	1	39	67
Chauncey,	1	2	2	6	2	10	23	1	12	12	26	...	...	51	74
Total miscellaneous companies,	23	138	139	451	69	874	1,699	29	1,163	937	394	406	175	3,044	4,743

RECAPITULATION.

Lehigh Valley Coal Company,	5	35	33	148	22	205	448	6	388	386	116	188	62	1,146	1,594
Lehigh and Wilkes-Barre Coal Company,	19	67	154	337	52	818	1,447	2	1,170	904	467	355	218	3,171	4,618
Delaware and Hudson Canal Company,	12	55	73	253	33	531	957	12	657	409	262	306	132	1,778	2,735
Susquehanna Coal Company,	5	85	40	230	20	420	800	9	588	528	135	148	89	1,497	2,297
Miscellaneous companies,	28	138	139	451	69	874	1,699	29	1,103	937	394	406	175	3,044	4,743
Total of all companies,	69	380	439	1,419	196	2,848	5,351	83	3,906	3,164	1,374	1,403	706	10,636	15,987

TABLE NO. VI.—*Showing the number of days worked by each breaker at every colliery and for each month during 1880.*

NAME OF THE COLLIERIES.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
LEHIGH VALLEY COAL COMPANY.													
Exeter,	19.70	15.40	13.65	15.80	13.00	14.00	11.30	14.00	22.10	19.05	21.85	14.20	194.05
Prospect,	20.15	14.70	9.75	14.15	12.75	13.50	11.25	12.85	18.40	20.05	22.50	15.85	185 95
Mineral Spring,	20.20	14.90	9.45	13.15	11.40	13.15	11.50	13.05	16.05	16.95	19.50	14.05	173.35
Midvale,	14.10	15.00	8.50	12.45	11.30	11.60	9.55	10.80	13.80	16.30	18.95	15.00	157.35
Henry,	21.10	23.65	16.30	12.10	14.70	12.65	13.15	12.00	14.00	20.95	18.25	22.40	201.25
LEHIGH AND WILKES-BARRE COAL COMPANY.													
Wanamie,	17.25	2.50	13.50	15.75	12.25	12.50	11.75	11.50	19.50	17.75	18.50	14.75	167.50
Sugar Notch Shaft,	18.00	2.75	14.00	16.00	12.50	13.50	12.00	14.00	22.25	19.00	20.00	14.00	178.50
Sugar Notch Slope,	. . . . .	. . .	. . .	. . . . . .	. . . .	. . .	11.75	13.25	20.75	18.00	17.75	14.75	96.25
Hartford,	20.50	3.75	15.00	15.50	12.50	13.25	11.50	14.00	23.50	20.00	19.50	15.50	184.25
Empire,	19.50	. .	12.00	16.75	12.75	14.00	11.75	13.50	22.00	19.00	20.50	14.00	176.25
Diamond,	19.25	11.25	14.75	16.50	13.00	13.50	12.00	14.00	24.00	18.25	20.00	14.00	190.50
Hollenback,	3.25	9.75	15.00	17.25	13.00	14.00	12.00	14.00	25.50	18.00	19.75	17.00	178.75
Washington,	18.75	3.00	14.25	18.00	13.00	14.00	11.75	13.50	22.75	20.50	21.50	16.00	187.00
Nottingham,	17.75	4.50	14.75	17.00	13.00	14.00	11.50	13 00	21.00	19.00	19.75	14.50	180.25
Lance,	15.25	2.25	12.50	14.00	10.75	12.25	9.50	12.25	18.75	16.00	16.00	11.50	151.00
DELAWARE AND HUDSON CANAL COMPANY.													
Mill Creek,	18.00	14.75	14.50	17.00	12.25	13.50	11.50	13.75	21.75	16.25	18.50	15.50	187.25
Pine Ridge,	23.25	15.00	13.50	16.50	13.00	13.50	11.00	14.00	22.50	17.25	22.25	12.00	193.75
Laurel Run,	19.50	12.50	14.75	17.50	13.00	14.00	12.00	14.00	20.75	16.50	19.95	16.05	190.50
Baltimore Slope,	18.25	14.50	15.00	17.25	12.00	14.00	12.00	13.25	21.00	17.25	21.50	16.25	192.25
Baltimore Tunnel,	17.00	13.25	15.00	17.50	13.00	14.00	11.25	14.00	21.00	17.00	22.25	15.25	190.50
No. 2, Plymouth,	18.50	11.50	11.00	9.25	9.50	12.00	10.25	13.25	19.25	16.25	17.75	13.50	162.00
No. 3, Plymouth,	2.00	10.00	14.00	14.00	8.00	11.75	9.50	10.50	13.00	15.75	18.75	13.50	140.75
No. 4, Plymouth,	18.25	5.75	10.25	11.25	10.00	13.00	11.50	11.50	15.50	16.00	17.50	11.75	152.25
No. 5, Plymouth,	19.50	16.30	14.80	17.60	12.50	14.00	12.00	13.60	25.00	20.25	22.20	15.75	203.50
SUSQUEHANNA COAL COMPANY.													
Breaker No. 1,	21.50	19.50	15.50	22.00	23.25	24.75	23.75	23.00	20.25	23.75	21.25	17.75	256.25
Breaker No. 2,	15.25	19.00	15.75	22.00	24.50	25.75	23.75	23.00	23.50	25.00	22.25	16.00	255.75
West Nanticoke, No. 3,	17.70	12.80	12.80	17.80	9.40	17.40	24.20	22.80	20.50	19.60	20.30	16.30	211.60
West Nanticoke, No. 5,	. . . .	. .	. . .	25.25	21.50	24.75	24.00	24.00	25.00	25.25	21.25	17.50	208.50

MISCELLANEOUS COMPANIES.

Avondale,	10.40	12.80	15.80	11.45	12.80	14.80	12.00	14.80	25.70	17.75	18.85	14.85	182.00
Boston,	. . . . . .	. . .	. . .	. . . .	. . .	. . .	. .	. . . . .	. .	. .	. . .	. . . .	167.20
No. 1 Shaft, Kingston,	18.00	11.50	14.75	15.75	13.00	13.50	12.00	14.00	24.50	18.75	21.50	16.50	193.25
No. 2 Shaft, Kingston,	15.75	15.00	15.75	13.50	11.00	14.00	11.00	14.25	24.50	18.00	23.00	16.25	192.00
Gaylord,	. . . . . .	. . . .	13.25	17.00	12.25	14.00	11.00	13.75	21.25	19.25	19.25	17.75	158 75
Franklin,	1.75	5.00	9.25	11.25	11.00	10.00	10.75	11.00	14.50	17.75	21.75	17.00	141.25
Wyoming,	13.00	15.60	11.00	14.30	12.20	13.40	10.60	12.50	18.60	18.50	19.80	17.50	177.00
Forty Fort,	19.00	10.00	12.50	11.00	11.50	13.25	11.25	13.25	20.00	17.25	20.00	17.00	176.00
Enterprise,	15.90	5.50	13.60	13.20	12.20	12.40	10.90	13.10	19.60	16.80	18.90	15.90	168.00
East Boston,	12.90	12.20	14.10	12.90	11.70	11.40	. . . .	11.80	17.90	14.60	16.60	13.90	150.00
Black Diamond,	16.10	11.50	14.75	12.05	10.00	13.80	11.40	13.80	19.90	17.70	19.50	16.45	176.95
Maltby,	18.00	14.00	8.00	15.00	12.00	12.00	11.00	13.00	18.00	15.00	17.00	18.00	171.00
Dodson,	18.60	13.80	11.20	12.80	9.70	10.50	8.90	10.40	17.40	Idle.	18.40	16.50	148.50
Red Ash,	16.75	8.75	13.70	15.75	13.00	14.00	11.60	14.00	21.25	20.25	21.00	16.90	186.90
Raubville,	17.00	13.00	14.00	14.00	11.00	14.00	12.00	13.00	18.00	17.00	19.00	16.00	178.00
Salem,	18.00	19.00	11.00	17.00	13.50	16.00	17.00	18.00	19.00	20.00	22.00	24.00	214.50
Hillman,	18.00	13.00	12.75	13.00	13.00	13.00	14.00	14.25	20.75	18.00	20.25	15.50	185.50
Hollenbeck,	17.50	11.50	12.50	12.00	14.00	13.50	11.00	12.50	15.00	17.00	17.00	15.75	169.25
Warrior Run,	14.00	10.50	12.75	14.00	12.50	14.00	17.00	15.00	14.50	13.00	11.00	11.00	159.25

TABLE VII.—*Showing number and horse-power of each class of engines, and number of steam boilers at each colliery for 1880.*

NAMES OF THE COLLIERIES.	Number of hoisting engines.	Horse-power.	Number of breaker engines.	Horse-power.	Number of pumping engines.	Horse-power.	Number of fan engines.	Horse-power.	Number of donkey pumps.	Horse-power.	Number of mine locomotives.	Horse-power.	Total number of engines.	Total horse-power of engines.	Number of steam boilers.
LEHIGH VALLEY COAL COMPANY.															
1. Exeter,	4	310	1	65	2	265	2	120	...	....	1	40	10	830	16
2. Prospect,	8	635	1	75	...	....	3	225	...	....	1	25	13	960	28
3. Mineral Spring,	4	134	1	50	1	70	1	40	3	....	...	....	10	294	8
4. Midvale,	4	95	1	35	...	....	1	30	1	40	...	....	7	200	6
5. Henry,	6	500	1	35	...	....	1	40	6	300	...	....	14	875	12
Total Lehigh Valley Coal Company,	26	1,704	5	260	3	335	8	455	10	340	2	65	54	3,159	70
LEHIGH AND WILKES-BARRE COAL COMPANY.															
6. Diamond,	4	400	2	140	1	80	2	140	3	215	1	30	13	1,005	42
7. Hollenback,	4	400	1	80	1	400	2	180	...	....	...	....	8	1,060	15
8. Empire,	7	350	2	85	2	450	3	80	...	....	3	80	17	1,045	36
9. Hartford,	7	438	2	80	1	50	2	80	4	326	2	70	13	1,044	25
10. Sugar Notch Shaft,	4	200	2	65	1	80	1	20	2	60	...	....	10	425	15
11. Sugar Notch Slope,	4	280	2	120	2	240	2	80	...	....	...	....	10	720	19
12. Lance,	2	100	1	50	1	120	1	20	3	105	...	....	8	395	9
13. Nottingham,	4	290	1	60	1	80	3	160	3	90	2	60	14	740	21
14. Washington,	2	50	1	50	...	....	1	20	...	....	...	....	4	120	10
15. Wanamie,	3	180	1	50	1	175	1	20	1	40	...	....	7	465	9
Total Lehigh and Wilkes-Barre Coal Company,	41	2,688	15	780	11	1,675	18	800	16	836	8	240	109	7,019	201
DELAWARE AND HUDSON CANAL COMPANY.															
16. Mill Creek,	6	300	1	36	...	....	2	305	4	114	...	....	13	755	20
17. Pine Ridge,	5	220	1	51	...	....	2	100	7	197	...	....	15	568	15
18. Laurel Run,	2	117	1	51	...	....	2	98	4	56	...	....	9	322	9
19. Baltimore Slope,	2	154	1	61	...	....	1	49	4	105	...	....	8	369	14
20. Baltimore Tunnel,	3	127	1	43	...	....	2	117	6	317	1	25	13	629	21
21. Conyngham,	3	199	...	....	1	140	1	49	...	....	...	....	5	388	9
22. No. 1 Plymouth,	2	75	...	....	1	60	1	20	3	75	...	....	7	230	9
23. No. 2 Plymouth,	2	120	1	40	1	77	1	30	2	8	...	....	7	275	12

4. No. 3 Plymouth,	2	120	1	40	1	120	1	40	2	6	. .	. . . .	7	326	12
25. No. 4 Plymouth,	2	120	1	40	. . .	. . . .	1	49	3	160	. . .	. . . .	7	309	12
26. No. 5 Plymouth,	5	234	1	30	1	77	2	74	3	95	1	30	13	540	12
Total Delaware and Hudson Canal Company,	34	1,786	9	392	5	474	16	931	38	1,073	2	55	104	4,711	148

SUSQUEHANNA COAL COMPANY.

27. No. 1,	8	1,530	3	160	1	210	1	100	2	55	2	80	17	2,135	44
28. No. 2,	6	915	1	80	1	55	4	320	3	165	5	220	20	1,755	35
29. No. 3,	2	140	1	100	1	30	1	15	1	15	. . .	. . . .	6	300	15
Total Susquehanna Coal Company,	16	2,585	5	340	3	295	6	435	6	235	7	300	43	4,190	94

MISCELLANEOUS COAL COMPANIES.

30. Avondale,	3	170	1	60	1	90	1	40	4	. . . .	. . .	. . . .	10	360	16
31. Boston,	2	80	1	40	. . .	. . . .	. . .	. . .	. . .	. . . .	. .	. . . .	3	120	12
32. No. 1 Kingston,	2	121	1	31	1	182	. . .	. . . .	. . .	. . . .	. . .	. . . .	4	334	10
33. No. 2 Kingston,	3	237	1	197	. . .	. . . .	2	70	2	. . . .	2	50	10	554	19
34. Gaylord,	10	1,690	1	245	1	245	1	110	5	350	. . .	. . . .	18	2,640	13
35. Franklin,	4	205	1	30	2	125	3	90	. . .	. . . .	1	15	11	465	22
36. Wyoming,	5	276	1	51	. .	. . . .	2	60	2	7	. . .	. . . .	10	394	12
37. Forty Fort,	3	100	1	50	. . .	. . . .	2	36	2	14	. . .	. . . .	8	200	9
38. Enterprise,	2	144	1	30	3	40	2	23	. . .	. . . .	. . .	. . . .	8	237	11
39. East Boston,	4	720	1	60	. . .	. . .	1	30	5	350	. . .	. . . .	11	1,160	12
40. Black Diamond,	2	80	1	50	2	125	1	30	. . .	. . .	. . .	. . . .	6	285	13
41. Maltby,	4	150	1	50	1	. . . .	1	20	. . .	. . . .	. .	. . . .	7	220	22
42. Dodson,	2	180	1	50	1	750	1	35	2	60	. . .	. . . .	7	1,075	9
43. Red Ash,	1	40	1	30	. . .	. . . .	. .	. . . .	. . .	. . . .	. .	. . . .	2	70	3
44. Raubville,	1	20	1	20	. .	. . . .	1	15	. . .	. . . .	. . .	. . . .	3	55	6
45. Salem,	. . .	. . . .	1	40	. .	. . . .	. . .	. . . .	2	14	. . .	. . .	3	54	2
46. Hillman,	3	60	1	20	. . .	. . . .	1	15	. .	. . . .	. . .	. . . .	5	95	6
47. Hollenback,	1	30	1	25	. . .	. . . .	1	25	1	20	. . .	. . . .	4	100	5
48. Chauncey,	1	30	. . .	. . . .	. . .	. . . .	. . .	. . . .	. . .	. . . .	. . .	. . . .	1	30	
Total miscellaneous companies,	53	4,333	18	1,079	12	1,557	20	599	25	815	3	65	131	8,448	208

RECAPITULATION.

Lehigh Valley Coal Company,	26	1,704	5	260	3	335	8	455	10	340	2	65	54	3,159	70
Lehigh and Wilkes-Barre Coal Company,	41	2,688	15	780	11	1,675	18	800	16	836	8	240	109	7,019	201
Delaware and Hudson Canal Company,	34	1,786	9	392	5	474	16	931	38	1,073	2	55	104	4,711	148
Susquehanna Coal Company,	16	2,585	5	340	3	295	6	435	6	235	7	300	43	4,190	94
Miscellaneous Companies,	53	4,333	18	1,079	12	1,557	20	599	25	815	3	65	131	8,448	208
Grand total,	170	13,096	52	2,851	34	4,336	68	3,220	95	3,299	22	725	441	27,527	711

TABLE NO. 8.—*Showing the state of ventilation in all the collieries operated in the Middle District of Luzerne and Carbon counties, for the year endnig December 31, 1880.*

NAMES OF COLLIERIES.	Power by which the ventilation is produced.	Revolutions per minute of fan	Total cubic feet of air per minute at the inlet.	CUBIC FEET OF AIR PER MINUTE PASSING NEAR THE FACE IN EACH SPLIT.							Total cubic feet of air per minute passing near the face.
				No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No 7.	
Exeter shaft,	Two fans,	60	130,380	16,660	12,400	18,230	21,770	15,510	. . . . .	. . . . .	84,570
Prospect shaft,	Two fans,	40	126,042	24,230	12,420	18,270	4,290	19,310	14,504	. . . . .	93,024
Oakwood shaft,	Fan,	42	95,920	14,130	17,810	25,000	11,280	. . . . .	. . . . .	. . . . .	68,220
Mineral Spring slope,	Fan,	65	76,500	22,000	15,000	16,500	15,500	. . . . .	. . . . .	. . . . .	69,000
Midvale slope,	Fan,	74	30,000	9,275	7,450	6,650	. . . . .	. . . . .	. . . . .	. . . . .	22,775
Henry shaft,	Fan,	65	111,400	15,000	12,780	17,410	8,930	. . . . .	. . . . .	. . . . .	54,120
Baltimore slope,	Fan,	85	78,370	7,600	8,600	23,800	25,200	. . . . .	. . . . .	. . . . .	65,200
Mill Creek slope, No. 1,	Fan,	42	144,600	10,000	17,200	18,100	17,000	12,000	12,100	9,000	95,400
Mill Creek slope, No. 2,	Fan,	75	74,200	10,200	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	10,200
Laurel Run slope,	Fans, No. 1, No. 2, No. 3,	80 58 80	120,455	6,230	7,455	49,835	7,680	8,740	8,000	. . . . .	87,940
Pine Ridge shaft,	Fan,	. . .	115,800	14,000	7,600	17,400	13,000	. . . . .	. . . . .	. . . . .	52,000
Baltimore tunnel,	Fan & furn.,	70	88,170	15,660	21,945	2,000	20,240	8,330	. . . . .	. . . . .	68,175
Conyngham shaft,	Fan,	70	28,000	15,400	3,900	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	19,300
No. 2 shaft, Plymouth,	Fan,	. . . .	63,300	18,460	19,200	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	37,660
No. 3 shaft, Plymouth,	Fan,	70	49,630	22,375	24,685	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	47,060
No. 4 shaft, Plymouth,	Fan,	80	54,470	18,400	19,670	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	38,070
No. 5 shaft, Plymouth,	Fan,	112	55,000	10,000	10,000	6,000	11,000	5,000	. . . . .	. . . . .	42,000
No. 5 shaft, Locomotive road,	Fan,	112	46,000	33,000	. . .		.	. . . . .	. .	. . . . .	46,000
Hollenback shaft,	Two fans,	30	232,440	22,400	48,500	25,600	24,300	21,560	18,500	17,000	177,860
Diamond shaft,	Fan,	45	116,500	6,300	23,600	25,220	23,400	. . . . .	. . . . .	. . . . .	135,220
Empire shaft,	Two fans,	75	90,000	15,000	15,120	22,100	8,850	. . . . .	. . . . .	. . . . .	61,070
Empire Hillman vein,	Fan,	. . . .	90,000	10,500	8,775	38,000	30,400	. . . . .	. . . . .	. . . . .	87,675
Hartford new slope,	Fan,	56	70,220	12,200	13,400	13,800	12,600	. . . . .	. . . . .	. . . . .	52,000
Hartford Red Ash vein,	Fan,	50	27,100	8,160	5,820	3,640	. . .	. . .	. . . . .	. . . . .	17,620
Sugar Notch, No. 9,	Fan,	105	78,025	17,630	9,750	9,500	12,560	10,560	. . . . .	. . . . .	60,000
Sugar Notch, No. 10,	Two fans,	100 75	77,000	14,600	21,600	27,000	. . . . .	. . . . .	. . . . .	. . . . .	62,600
Nottingham Shaft,	Two fans,	. .	110,000	22,000	169,000	15,000	. . . . .	. . . . .	. . . . .	. . . . .	53,900
Washington, No. 16,	Two fans,	85 72	87,000	23,200	26,100	12,300	13,500	. . . . .	. . . . .	. . . . .	75,100
Lance, No. 11,	Fan,	93	54,700	27,500	36,400	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	63,900
Wanamie slope,	Fan,	85	48,780	12,600	27,000	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	39,600
No. 1 slope, Nanticoke,	Fan,	50	41,900	9,000	7,300	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	16,301

No. 2 slope, Nanticoke,	Two fans,	65 62	89,000	21,500	37,500	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	59,000
No. 4 slope, Nanticoke,	Fan,	75	95,390	29,400	42,100	6,300	. . . . .	. . . . .	. . . . .	. . . . .	77,800
No. 1 shaft, Nanticoke,	Two fans,	60 58	51,000	21,600	9,200	. . . . .	. . . . .	. . . . .	. . . .	. . . . .	21,800
No. 2 shaft, Nanticoke,	Fan,	52	58,420	20,050	22,340	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	42,390
Tunnel No. 2, Nanticoke,	Fan,	60	37,400	7,500	19,200	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	26,700
Tunnel No. 4, Nanticoke,	Fan,	60	21,685	9,910	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	9,910
Grand Tunnel, Nanticoke,	Fan,	65	26,540	14,570	. . . . .	. . . . .	. . . . .	. . .	. . . . .	. . . . .	14,570
Avondale shaft,	Two fans,	135	92,090	21,300	16,700	11,331	32,000	8,100	. . . . .	. . . . .	79,434
Boston shaft,	Two furna's,	. .	49,850	20,600	16,250	6,170	. . . .	. . . .	. . . . .	. . . . .	42,420
Enterprise shaft,	Fan,	80	48,600	7,770	8,500	6,700	5,000	5,000	. . . . .	. . . . .	32,900
Wyoming shaft,	Fan,	45	82,600	21,900	21,000	16,200	11,600	. . . . .	. . . . .	. . . . .	70,700
Wyoming Little Vein,	Fan,	90	16,000	12,000	. .	. . . . .	. . . . .	. . . .	. . . . .	. . . . .	12,000
Forty Fort shaft,	Fan,	75	17,400	10,300	11,000	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	21,300
Forty Fort tunnel,	Fan,	75	21,000	16,000	. . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	16,000
No. 1 shaft, Kingston,	Fan,	. . .	27,300	13,500	9,600	. . . . .	. . . . .	. . . . .	. . . . .	. . . .	23,100
No. 2 shaft, Kingston,	Two fans,	35 60	96,050	16,700	10,800	28,000	15,600	. . . . .	. . . . .	. . . . .	71,100
Gaylord slope,	Fan,	100	62,000	38,600	20,400	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	59,000
Franklin old slope,	Fan,	75	56,375	23,800	21,270	. . . . .	. . . .	. . . . .	. . . . .	. . . . .	48,070
Franklin Brown slope,	Fan,	80	23,440	14,750	. . . . .	. . .	. . . . .	. . . . .	. . . . .	. . . . .	14,750
Maltby shafts,	Murphy fan,	220	58,800	7,800	14,300	3,000	. . . . .	. . . . .	. . . . .	. . . .	25,100
Dodson shaft,	Fan,	70	42,200	10,050	9,200	. . . . .	. . . . .	. . . . .	. . . .	. . . . .	19,250
Hutchison shaft,	Fan,	68	30,000	20,050	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	20,050
East Boston shaft,	Fan,	70	46,800	13,800	6,200	14,300	7,800	. . . .	. . . . .	. . . . .	42,100
Hillman slope,	Fan,	70	4,100	3,500	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	3,500
Salem, Shickshinny,	Natural,	. . . .	19,320	10,551	. . . . .	. . . .	. . . . .	. . . . .	. . . . .	. . . . .	10,551

TABLE 8.—*Continued.*

NAMES OF THE COLLIERIES.	NUMBER OF PERSONS EMPLOYED IN EACH SPLIT.							CUBIC FEET OF AIR PER MINUTE FOR EACH PERSON EMPLOYED.							Total cubic feet of air per minute at the outlets.
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5	No. 6.	No. 7.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	
Exeter shaft,	62	50	57	62	54	....	....	268.7	248	319.8	351	287	....	....	134,990
Prospect shaft,	35	12	55	6	60	24	....	692	1,035	332	715	321.8	604	....	131,720
Oak Wood shaft,	14	15	24	24	....	....	....	1,009	1,187	1,041.6	470	....	....	....	93,860
Mineral Spring slope,	34	48	39	8	....	....	....	647	312.4	423	1,935.5	....	....	....	75,000
Midvale slope,	30	13	8	....	....	....	....	309	573	756	....	....	....	....	30,800
Henry shaft,	47	31	48	12	....	....	....	319	412	362.7	744	....	....	....	129,870
Baltimore slope,	30	30	50	30	....	....	....	253	286.6	476	840	....	....	....	86,000
Mill Creek slope, No. 1,	24	45	36	30	20	12	9	416.6	382	502.7	566.6	600	1,008	1,000	153,500
Mill Creek, No. 2,	21	....	....	....	....	....	....	580.9	....	....	....	....	....	....	76,400
Laurel Run slope,	26	24	57	32	23	18	....	239.6	310.6	874	240	380	500	....	122,015
Pine Ridge shaft,	34	9	22	45	....	....	....	411.7	844	790.9	288.8	....	....	....	120,400
Baltimore Tunnel,	49	....	....	47	40	....	....	319.5	....	....	430.6	208	....	....	139,140
Conyngham shaft,	15	....	....	....	....	....	....	102.6	....	....	....	....	....	....	29,300
No. 2 shaft, Plymouth,	96	36	....	....	....	....	....	192	533	....	....	....	....	....	67,100
No. 3 shaft, Plymouth,	64	81	....	....	....	....	....	349.6	304.7	....	....	....	....	....	50,645
No. 4 shaft, Plymouth,	50	37	....	....	....	....	....	368	531.6	....	....	....	....	....	56,360
No. 5 shaft, Plymouth,	20	20	117	88	5	....	....	500	500	51.2	125	1,000	....	....	55,500
No. 5 shaft, Locomotive road,	18	....	....	....	....	....	....	1,833	....	....	....	....	....	....	48,000
Hollenback shaft,	38	3	23	27	43	7	11	589	16,160	1,113	900	501	2,642	1,545	225,000
Diamond shaft,	22	98	60	50	....	....	....	286.3	240.8	420	468	....	....	....	160,000
Empire shaft,	65	62	50	31	....	....	....	230.7	243.8	442	279	....	....	....	95,000
Empire Hillman vein,	36	40	78	40	....	....	....	291.6	219	487	760	....	....	....	94,500
Hartford New slope,	41	43	50	53	....	....	....	297.5	311.6	276	237.7	....	....	....	78,640
Hartford Red Ash vein,	41	52	25	....	....	....	....	199	111.9	145.6	....	....	....	....	27,200
Sugar Notch, No. 9,	14	70	45	2	63	....	....	1,259	139	211	6,280	167.6	....	....	66,690
Sugar Notch, No. 10,	50	44	30	....	....	....	....	280	490.9	900	....	....	....	....	53,000
Nottingham shaft,	160	181	60	....	....	....	....	137.5	93	250	....	....	....	....	125,100
Washington, No. 16,	64	80	25	20	....	....	....	362.5	326	492	675	....	....	....	90,400
Lance, No. 11,	61	25	....	....	....	....	....	450.8	1,456	....	....	....	....	....	63,900
Wanamie slope,	48	30	....	....	....	....	....	262.5	900	....	....	....	....	....	63,020
No. 1 slope, Nanticoke,	50	60	....	....	....	....	....	180	121.6	....	....	....	....	....	20,480
No. 2 slope, Nanticoke,	73	70	....	....	....	....	....	294.5	534	....	....	....	....	....	126,000
No. 4 slope, Nanticoke,	81	76	....	....	....	....	....	362.9	554	....	....	....	....	....	98,900
No. 1 shaft, Nanticoke,	86	15	....	....	....	....	....	251	613	....	....	....	....	....	53,600
No. 2 shaft, Nanticoke,	72	48	....	....	....	....	....	278	465	....	....	....	....	....	62,270
Tunnel No. 2, Nanticoke,	39	180	....	....	....	....	....	192	106.6	....	....	....	....	....	37,600
Tunnel No. 4, Nanticoke,	63	....	....	....	....	....	....	157	....	....	....	....	....	....	32,975

Grand Tunnel, Nanticoke,	98							148.6							34,375
Avondale shaft,	44	39	28	54	16			484	428	404.7	592.5	506			105,945
Boston shaft,	44	66	16					454 5	246	385.6					54,430
Enterprise shaft,	51	48	53	36	32			151	177	126	139	156			51,300
Wyoming shaft,	41	48	41	43				534	437.5	395	269.7				84,400
Wyoming Little vein,	22							545							16,000
Forty Fort shaft,	20	30						515	366.6						31,300
Forty Fort Tunnel,	92							174							19,000
No. 1 shaft, Kingston,	91	28						148	343						42,000
No. 2 shaft, Kingston,	74	40	40	30				225.6	270	700	520				105,950
Gaylord slope,	30	43						1,286.6	474						62,000
Franklin slope,															65,780
Franklin Brown slope,	80							184							35,520
Maltby shaft,	80	62	9					97.5	230.6	333					60,000
Dodson shaft,	32	50						314	184						43,000
Hutchinson shaft,	150							133.6							32,350
East Boston shaft,	39	22	53	19				353	281.8	269.8	410.5				57,900
Hillman slope,	30							116.6							4,000
Salem, Shickshinny,	23							458.7							20,000

TABLE NO. 9.—*List of collieries, operators, coal seams, thickness of seams, and*

Number.	NAMES OF THE COLLIERIES.	Class of opening.	Names of Operators.	Names of the Coal Seams mined.	Thickness of the seams.	
					ft	in
1	Exeter,	Shaft,	Lehigh Valley Coal Company,	Pittston vein,	9	0
2	Prospect,	do.	do. do.	Baltimore,	16	0
3	Oak Wood,	do.	do. do.	do.	16	0
4	Mineral Spring,	Slope,	do. do.	Baltimore and Ross,	12	0
	Mineral Spring,	do.	do. do.		4	6
5	Midvale,	do.	do. do.	Hillman,	7	0
6	Henry,	Shaft,	do. do.	Baltimore,	11	6
7	Diamond,	do.	Charles Parrish & Co.,	do.	16	0
8	Hollenback,	do.	do. do.	do.	15	0
9	Empire,	do.	do. do.	do.	16	0
	Empire,	do.	do. do.	Hillman,	7	0
10	Hartford,	Slope,	do. do.	Baltimore,	16	0
	do.	Tunnel,	do. do.	Ross,	16	0
	do.	do.	do. do.	Red Ash,	9	0
11	Sugar Notch, No. 9,	Slope,	do. do.	Ross,	16	0
	Sugar Notch, No. 9,	Tunnel,	do. do.	Red Ash,	10	0
12	Sugar Notch, No. 10,	Shaft,	do. do.	Kidney,	7	6
	Sugar Notch, No. 10,	do.	do. do.	Hillman,	10	0
13	Lance,	do.	do. do.	Bennett,	8	0
14	Nottingham,	do.	do. do.	Red Ash,	16	0
15	Washington,	Slope,	do. do.	do.	16	0
16	Wanamie,	do.	do. do.	Baltimore,	14	8
17	Mill Creek,	do.	Delaware & Hudson Canal Co.	do.	14	0
18	Pine Ridge,	Shaft,	do. do.	do.	12	0
19	Laurel Run,	Slope,	do. do.	do.	14	0
20	Baltimore Slope,	do.	do. do.	do.	14	0
21	Baltimore Tunnel,	Tunnel,	do. do.	do.	16	0
22	Conyngham,	Shaft,	do. do.	do.	16	0
23	No. 2, Plymouth,	do.	do. do.	Hillman,	11	0
	No. 2, do.	do.	do. do.	Cooper,	5	0
24	No. 3, do.	do.	do. do.	do.	6	0
25	No. 4, do.	do.	do. do.	Red Ash,	12	0
26	No. 5, do.	do.	do. do.	Bennett,	10	0
27	Tunnel No. 1,	Tunnel,	Susquehanna Coal Company,	Buck Mountain,	8	0
28	Tunnel No. 2,	do.	do. do.	do.	8	0
29	Honey Pot,	do.	do. do.	do.	8	0
30	Tunnel No. 4,	do.	do. do.	Ross,	4	0
31	Slope No. 1,	Slope,	do. do.	Red Ash,	8	0
32	do. 2,	do.	do. do.	Cooper,	6	6
33	do. 4,	do.	do. do.	Hillman,	8	0
34	Shaft No. 1,	Shaft,	do. do.	Bennett,	8	0
35	Shaft No. 2,	do.	do. do.	Red Ash,	8	0
36	Grand Tunnel,	Tunnel,	do. do.	Buck Mountain,	16	0
37	Avondale,	Shaft,	Delaware, Lackawanna and Western Company,	Red Ash,	21	0
38	Boston,	do.	Delaware, Lackawanna and Western Company,	Baltimore,	21	0
	Boston,	do.	Delaware, Lackawanna and Western Company,	Lance,	6	6
39	No. 1, Kingston,	do.	Kingston Coal Company,	Bennett and Cooper,	18	6
40	No. 2, do.	do.	do. do.	Lance,	6	0
41	No. 2, do.	Slope,	do. do.	Cooper and Bennett,	17	6
42	Gaylord,	do.	Gaylord Coal Company,	Cooper, Bennett and Ross,	25	10
43	Brown Slope,	do.	Franklin Coal Company,	Baltimore,	16	0
44	Old Slope,	do.	do. do.	do.	16	0
45	Wyoming,	Shaft,	J. H. Swoyer,	do.	22	0
46	Forty Fort,	Tunnel,	do.	do. split,	5	0
47	Forty Fort,	Shaft,	do.	do.	6	0
48	Enterprise,	do.	H. C. Roberts & Co.,	do.	7	0
49	East Boston,	do.	W. G. Payne & Co.,	Cooper and Bennett,	18	0
50	Hutchinson,	do.	J. C. Hutchinson,	Bennett,	6	6
51	Maltby, No. 1,	do.	C. S. Maltby,	Maltby,	5	6
52	Maltby, No. 2,	do.	do.	Cooper,	9	0
53	Dodson,	do.	Plymouth Coal Company,	Lance, Hillman & Baltim'r.	29	0
54	Red Ash,	Slope,	Red Ash Coal Company,	Red Ash and Ross,	22	0
55	Albright,	Shaft,	Albright Coal Company,	Red Ash,	11	0
56	Raubville,	Drifts,	Waddell & Walters,	Red Ash and Ross,	19	0
57	Warrior Run,	Slope,	A. J. Davis & Co.,	B, C, D, and E,	31	0
58	Salem,	Drifts,	Salem Coal Company,	Red Ash,	8	0
59	Hillman,	Slopes,	H. Baker Hillman,	Hillman, Abbott, and Bawkley,	19	0
60	Hollenback,	Slope,	Roberts & Poole,	Hillman and Orchard,	13	6
61	Chauncey,	Tunnel,	T. P. McFarland,	Red Ash and Ross,	19	0

names of officers in the Middle District of Luzerne and Carbon counties for 1880.

Names of the mine bosses.	Names of the outside foremen.	Names of the superintendents.	Names of general foremen.	General superintendents.
A. Rees,	A. G. Mason,	Fred. Mercur,	Fred. Mercur,	Fred. Mercur.
William Samuel,	William Patten,	do.	do.	do.
Thomas Samuel,	do.	do.	do.	do.
do.	John Colvin,	do.	do.	do.
do.	do.	do.	do.	do.
Richard Martin,	William Patten,	do.	do.	do.
Thos. E Lewis,	William E. Lines,	do.	do.	do.
David Jonathan,	Thomas R. Connor,	Wm. T. Smyth,	F. B. Parrish,	G. & F. B. Parrish.
Joseph G. Wier,	Wm. L. Stewart,	do.	do.	do.
Lewis S. Jones,	Thos. Williamson,	do.	do.	do.
do.	do.	do.	do.	do.
David R. Roberts,	Merrit Frederick,	do.	do.	do.
do.	do.	do.	do.	do.
do.	do.	do.	do.	do.
Thos. W. Morgan,	Levi G. Kintzer,	do.	H. C. Brodhead,	do.
do.	do.	do.	do.	do.
Wm. H. Hoskings	D. C. Tiffany,	do.	do.	do.
do.	do.	do.	do.	do.
Daniel Rees,	James Linn,	do.	F. E. Tiffany,	do.
James B. Davies,	George R. Conner,	do.	do.	do.
M. R. Morgans,	P. H. Garrahan,	do.	do.	do.
Nicholas Rapson,	Robert O. Leas,	do.	W. T. Leas,	do.
John E. Cook,	W. L. Foote,	C. H. Scharaar,	C. H. Scharaar,	A. H. Vandling.
John T. Moore,	W. A. Gustin,	do.	do.	do.
Hugh McDonald,	D. W. Kimble,	do.	do.	do.
Thos. Pamplyn,	John Bowers,	do.	do.	do.
William W. Rees,	Edward Mackin,	do.	do.	do.
do.	W. H. Doyle,	do.	do.	do.
William Cobley,	J. W. Vandling,	do.	do.	do.
do.	do.	do.	do.	do.
Jos. M. Steever,	James Stevens,	do.	do.	do.
Edward Hahn,	Charles Lawson,	do.	do.	do.
Caleb Shonk,	Elijah Fox,	do.	do.	do.
Samuel Witson,	J. C. Brader,	D. W Fvans,	George T. Morgan,	J. J. Wistar.
do.	do.	do.	do.	do.
do.	do.	do.	do.	do.
Frank Micholass,	do.	do.	do.	do.
Michael Corgan,	do.	do.	do.	do.
Thos. R. Williams,	do.	do.	do.	do.
David Evans,	do.	do.	do.	do.
Joseph Turner,	do.	do.	do.	do.
Joseph Warne,	do.	do.	do.	do.
Worthy Carver,	J. W. McFarland,	do.	do.	do.
Thos. J. Phillips,	Conrad Lee,	Thomas D. Davies,	B. Hughes,	W. R. Storrs.
Henry P. Davies,	Robt. Hutchinson,	do.	do.	do.
do.	do.	do.	do.	do.
Daniel R. Davies,	Thos. L. Morgan,	Morgan D. Rosser,	Daniel Edwards,	Daniel Edwards.
Daniel L. Lewis,	Morgan D. Rosser,	do.	do.	do.
John Edwards,	do.	do.	do.	do.
George Picton,	David L. Isaacs,	D. L. Isaacs,	do.	do.
Samuel Thomas,	Charles Farren,	Wm. H. Thomas,	Wm. H. Thomas,	R. R. Morgan.
John Hughes,	do.	do.	do.	do.
Jenkin B. Jones,	Philip Winterstein	Wm. McCullock,	F. M. Shoemaker,	F. M. Shoemaker.
John W. Thomas,	James D. Patton,	do.	do.	do.
Phil. McCabe,	do.	do.	do.	do.
Robert Hislop,	John Eustice,	do.	C. D. Simpson,	C. D. Simpson.
John Parry,	Phinny Watt,	E. F. Payne,		W. G. Payne.
Jas. L. Crawford,	Frank P. Kunkle,			J. C. Hutchinson.
George Smith,			Thomas Lawther,	Oscar A. Fowler.
do.			do.	do.
Michael Shonk,	E. F. Stevens,		Micheal Shonk,	E. F. Stevens.
Anthony Gard,	Wolf Riester,	M. B. Williams,		M. B. Williams.
William J. Price,	—— Walter,			Thomas Phillips.
James Waddell,	George Waddell,	James Waddell,		Thomas Waddell.
John C. Jone,	Robert F. Lloyd,	Jas. E. Roderick,	Jas. E. Roderick,	A. J. Davies.
				J. H. Harman.
George Faurick,	George Hillman,	H. Baker Hillman,	George Faurick,	H. Baker Hillman.
John J. Meighan,	M. Michaels,	Robert S. Poole,		Robert S. Poole.
B. Alsbach,	Thomas Cooper,	T. P. McFarland,		T. P. McFarland.

LUZERNE AND CARBON COUNTIES.

EASTERN DISTRICT.

To His Excellency Henry M. Hoyt,
Governor of the Commonwealth of Pennsylvania:

Sir: The twenty-second section of the act of Assembly, entitled "An act providing for the health and safety of persons employed in coal mines," approved March 3, 1870, provides that, "it shall be the duty of each inspector to make an annual report of his proceedings to the Governor of the Commonwealth at the close of every year, in which he shall fully enumerate all the accidents in and about the coal mines and collieries of his district, marking in tabular form those accidents producing death or serious injury to persons, and the state of the workings of said mines, with regard to the safety of the workmen therein, and to the ventilation thereof, and the result of his labors generally shall be fully set forth."

In accordance with the requirements of this section of the statute, I have the honor to submit to your Excellency my report as inspector of coal mines and collieries for the eastern district of Luzerne and Carbon counties, for the year ending December 31, 1880. Ignoring all criticism, I have strictly followed the requirements of the act, as above quoted, in making my report. I have carefully compiled tables of accidents and other useful statistics, which give an accurate statement as to how safely we have passed through the year without suffering serious disaster. The review of the year's work is, on the whole, satisfactory, though it is very easy to perceive where many mistakes have been made, and, as a consequence of such mistakes, where many accidents have occurred that, with proper care, might have been averted. If all parties concerned would but learn the lessons taught by the sad experiences of the year, we might have reasonable hope for great improvement in the future; but I very much fear that the lessons dearly bought by accidents are soon forgotten, and that men will repeat the reckless blunders over and over again that have proven fatal to so many of their associates. The great necessity to insure greater safety in the business of mining coal is rigid discipline with regard to those engaged in it in the mines and about the breakers.

While far from believing that all is being done that can and ought to be done to reduce accidents, still it gives me great pleasure that I can make so favorable a report in this respect for the year 1880, as compared with former years. The number of lives lost during the year was thirty-seven, against fifty-nine for 1879, a reduction of twenty-two; the number of widows was twenty-five against thirty-one for 1879, a reduction of six; the number of orphans was eighty-three against one hundred and twenty-five for 1879, a reduction of forty-two; and the number of persons seriously injured was one hundred and two against one hundred and thirty-four for 1879, a reduction of thirty-two. These figures are very gratifying; but the following are still more so: The whole number of tons of coal mined in the district during the year was 6,293,457 tons, which shows a ratio of 170,093 tons mined for each life lost, which is by far the best record ever had for any year in this district in the history of mining coal. The nearest approach to it was in 1878, when the ratio was 145,396 tons mined per life lost. The ratio in 1879 was 121,730 tons per life lost. Taking the last four years, the average ratio has been 136,630 tons mined per life lost. In view of these figures, I think I am justified in congratulating all who have contributed towards this improvement.

The deaths are chargeable to the following causes: Falls of roof and coal, twenty-five; falling down shaft, one; premature blasts and blasts hanging fire, three; crushed by mine cars, four; burned to death by his clothing taking fire from his lamp, one; miscellaneous causes on the surface, three. It will be noticed that the deaths from falls of roof and falls of coal reach the fearful proportion of sixty-seven and a half per centum of the whole number of deaths for the year. There was no fatal or serious accident from explosions of gas.

In my tables, it will be perceived that I have divided the collieries in the district into four classes, the large corporations each constituting a class, and the smaller companies and operators constituting the fourth class. It seems proper for me to call attention here to the record of each of these classes with regard to their ratio of coal mined per life lost. The class composed of small companies and operators has the most favorable record of any for the year, having mined 185,821 tons per life lost. The Pennsylvania Coal Company comes next, and is nearly as good, having mined 181,773 tons per life lost. Then comes the Delaware and Hudson Canal Company with 146,069 tons per life lost; and the Delaware, Lackawanna and Western Railroad Company with 136,792 tons per life lost. This order is almost wholly reversed from former years. The Delaware and Hudson Canal Company has always had the most favorable record in this respect up to last year; the Delaware, Lackawanna and Western Railroad Company has always had the second best record; the Pennsylvania Coal Company next; and the smaller companies last; so that the saying is almost literally verified: "The last shall be first and the first shall be last" There is a way to account for this, but I have not time now to explain. All are to be congratulated that their respective records are so favorable.

This being the last year of my present term, I can review the result of my labors for the last four years with pleasurable satisfaction. I have good reason to believe that my strict attention to duty, and rigid enforcement of the law, have resulted in materially reducing accidents, and in saving life; and I know that the sanitary condition of the collieries with regard to ventilation, and their safety in other respects, have vastly improved. I have the consciousness of having tried to perform my duties with due respect to all with whom I have had to deal in an official capacity; and I feel very grateful for the courtesy and kindness generally extended to me by mine officials. There have been some unpleasant incidents in my relations with some of the officials, but they were such as I could not avoid and perform my oath-bound duties, and I can truly say that I have no other than the most kindly feeling towards them all. Hoping that every future year may show an improvement in every respect on the past, and with very high esteem, this report is most respectfully submitted by

Your most obedient, humble servant,

WILLIAM S. JONES,
Inspector of Coal Mines.

Scranton, Pa., *February 15, 1881.*

DEATHS FROM FALLS OF ROOF AND FALLS OF COAL.

There were twenty-five deaths from falls of roof and falls of coal in this district during the year, which is sixty-seven and two-thirds per cent., (nearly), of the whole number of fatal accidents from all causes. As I have stated in each of my annual reports, the remedy for this class of accidents is entirely in the hands of the miners, and the mine bosses should see to it that the remedy is applied. It is utterly impossible for an inspector to do more than point out the duties devolving upon these parties, and to give them such advice as the exigency of the case seems to require. Both miners and mine bosses, however, refuse to take advice, and feel aggrieved when it is tendered. They apparently prefer to take unwarrantable risks by following the old, careless, reckless manner of working which annually results in the uncalled-for death of so many of their number. Nothing will reduce the number of so-called accidents from these causes but strict and rigid discipline, enforced by general and special rules such as I have repeatedly recommended in my former reports, and which I again recommend with all the earnestness that I am capable of.

Accident No. 2.—Michael Casey, a miner at the Meadow Brook tunnel, William Connell & Co., Scranton, was instantly killed February 25th by a fall of roof. Casey was working in this place only for this one shift, in place of Patrick Donohue's laborer, his own working place being in another part of the mine, and when killed he was pitching coal back to the car. The party were engaged in taking out pillars, and the place was worked with too little timber. Though the miners asserted positively that there were two props standing where the fall occurred, I could not satisfy myself that such was the case. The props could have been seen had such been there, as the fall would have discharged them outwardly. The fall was an extensive one, running inward from the point where the man was killed for upwards of ten yards. The roof had been creeping all day, and at eight o'clock, P. M., the crash came, killing Casey, as above stated. Michael Casey was of Irish nationality, and left a widow with four children in poor circumstances to mourn his untimely death.

ACCIDENT NO. 3.—Patrick McHale, a miner at the No. 2 shaft, Pennsylvania Coal Company, Dunmore borough, was instantly killed March 2d by a fall of roof immediately after firing a blast. McHale took a pick after the blast was fired and with it sounded the rock, when his partner, John Dolphin, asked him if it was safe, to which he answered that he thought it was. He then commenced to mine out the stub of the blast just fired, and the rock fell on him, killing him instantly. The rock which fell was of a soapstone nature, and was eight feet long by four feet wide and an average of twelve inches thick. It is not necessary to inform an experienced miner that no reliance can be placed in the sound of overhanging rock of this nature, and yet there are but very few but will recklessly risk their lives under such rock, trusting alone to the sound, without attempting to bar it down or to secure it with props. John Dolphin, the surviving miner, readily acknowledged that they had examined the rock before firing the blast, and that they considered it dangerous, and that they nevertheless did nothing to make the place safe. John Moffatt, also, the mine boss, had been in the chamber in the afternoon of the day before, and had then cautioned them to be careful of this rock, as it was surely getting thinner at the face; and he gave it as his opinion that the rock had not been properly examined by the miners, and he believed that if the miners had tried to bar it down before it fell with fatal result to one of their number, they would have found no trouble in doing so, and I agree with his views entirely. There is no doubt but this unfortunate man lost his life through his own neglect and that of his partner. Patrick McHale was of Irish nationality, and left a widow with six children, in poor circumstances, to mourn his loss.

ACCIDENT NO. 4.—Michael Flynn, a laborer, working for Charles Tierney, at the Jermyn Green Ridge shaft, John Jermyn, Esq., Scranton city, was killed March 16th by a fall of roof. The mass that fell in this case consisted of bony, seven inches thick, and the surface area of the fall was thirty-five square yards. There was but one prop under this, and that one was twelve feet from the face, and twenty-one from the nearest prop outside of it! This single prop was stood under the very edge of the bony, and was still standing when I visited the place after the accident, the bony having broken off all around it. The place was being opened from the chamber of James May through a pillar to recover a chamber that had been closed by a fall of roof, and at the point where the fall occurred, it was thirty-five feet wide.

Joseph D. Lloyd, the mine boss, had been in this working place twice on the day before the accident, and he testified on the investigation that "he thought the place was pretty good at that time; that he stayed there for some time, and helped to stand the prop referred to." He saw the bony hanging there and said, "It was not heavy, exactly, but where we stood the prop it *was* heavy, and that was why we stood the prop." The bony was undoubtedly heavy, and should have been taken down, and no attempt should have been made to timber it.

James May, the miner working in the adjoining chamber, was present when the accident occurred, and the substance of his testimony on the inquiry is as follows: "I was after firing a shot, and Tierney had just fired a blast also. I then went to look at Tierney's place, and seeing the overhanging bony, I said, 'Charley, this is coming down.' And he answered, 'Oh, no; its tough. I guess it will stand until we load this car.' But I told his laborer, Michael Flynn, a couple of times, to go back out of danger, but he did not heed me, and I cried out to him at last, saying, 'Get out of that or I will strike you with a piece of coal.' He then asked, 'Is it to me you are talking?' And I told him it was, and again ordered him to get back out of the way, as the roof was coming down, and he then moved away, but did not go far enough, nor in the right direction. I then took a drill, and Charley also took a drill, to bar the bony down, and just as I put my drill over it the bony began to fall. It came down very easy—did not bear hard on the drill. We could not see Flynn from where we were, nor do I think that he could see us. We were close to the face, and he was down the road, with a car standing between us. I had advised Tierney to stand props under this bony before the accident, as I did not consider it safe, and he said he would bar it down after the car was loaded."

Enough evidence was adduced on the investigation to warrant the conclusion that Charles Tierney, the miner, was very much to blame for allowing his chamber to be in such a dangerous condition as to make such an accident as this possible. Nor can J. D. Lloyd, the mine boss, escape censure in that he did not see that this overhanging bony was "carefully secured against falling." He should have seen to it that this bony was barred down, as no attempt should have been made to timber it under any circumstance whatever. The unfortunate Flynn himself was undoubtedly guilty of contributary negligence in not heeding the repeated warnings of James May by seeking a place of safety. He was of Irish nationality, and left a widow with two children.

Accident No. 6.—John Mort, a laborer, working for William Llewellyn, at the Cayuga shaft, Delaware, Lackawanna and Western Railroad Company, Providence, was instantly killed, March 27, by a fall of roof "immediately after firing a blast." The colliery was not working on the day of the accident, but Llewellyn and Mort went "to work to prepare a bit of coal for the following Monday, and to move the track nearer the center of the chamber." They fired a blast which was too heavily charged with powder, and thereby discharged a prop. Hearing the prop fall they rushed back immediately to restand it, and in five minutes after the blast exploded the fall of roof occurred, killing Mort on the spot.

Thomas Watkins, the mine boss, said : " It is my opinion that both men were very reckless, as both must have known that the rock was about to fall. They went back too soon after firing the blast, and I have talked to them about this nearly every day, but it seems to be of no use."

The chamber was in a very bad condition, and on my calling the attention of Mr. Watkins to that fact, he acknowledged that it was not properly timbered, but he promised to put it in a safe condition before any more coal was mined in it. How they succeeded in working so long without an accident is a mystery. John Mort was of Welsh nationality, and left a widow with two children (in Wales) to mourn his loss.

ACCIDENT No. 8.—Thomas McLaughlin, a miner, at No. 10 shaft, Pennsylvania Coal Company, Hughestown borough, was instantly killed, April 19, by a fall of coal. The place where this accident occurred was an air-way only twelve feet wide, and was as safe a place to work in as could be desired. The coal was only a trifle over six feet high, and the roof was excellent. The coal was mined in three benches, the middle one being the mining bench, and at this time the top bench had been undermined for several feet clear across the face, and an entrance had been driven through the pillar to O'Malia's heading, and in this entrance there was a slip running through the top bench, and another about the center of the air-way. A blast had been fired a short time previous in the entrance, and McLaughlin was working out the stub of that blast when he was killed. Neither of the miners had done anything to ascertain whether the top bench was safe or not; they had not examined it in any way, much less had they tried to bar it down. There was no one to blame for this accident but the miners themselves, and on their part there was no excuse. Thomas McLaughlin was of Irish nationality, and left a widow with two children.

ACCIDENT No. 9.—Andrew Singleman, a miner, at the Tompkin's shaft, Alva Tompkins & Co., Pittston borough, was killed, April 23, by a fall of roof. Singleman and Thomas Powell were working this chamber in partnership, hence they were both equally responsible for its safe or unsafe condition. Powell, the surviving miner, made the following statement: " A prop standing under the roof, which fell, had been discharged by a blast about thirty minutes before the accident. During this time Singleman was in the face mining out coal left by the blast, and I was loading a car. We knew that the prop had been discharged by the blast, but we did nothing to assure ourselves that the roof was safe. The prop had been put there the day before, and the reason it was put there was, that we thought it was a bad piece of roof, and we intended to keep it up if we could. It was certainly more necessary to restand the prop when it was discharged than it was to stand it in the first place; but we neglected it until it was too late. I did not know whether the roof was working or not when we returned to the face after firing the blast; but after I had loaded the car, and as I was standing between two props near the car, I noticed that it was working, and I then went to examine it and found that it was coming down. I then ran back along the upper rib and called to Singleman to come away quick, and he ran toward me right under the rock, which fell on him and crushed him to death. I consider that the blame for Singleman's death rest equally upon me and himself, as we were both equally responsible for the safe condition of the chamber."

The foregoing admissions on the part of Powell are extremely humiliating, and yet they are only the unvarnished truth in the case, and were made by him without any attempt at excusing himself. These miners had a bad reputation for neglect in propping and blasting out timber after standing them. The mine boss, D. W. Evans, complained, that he frequently had occasion to censure them for neglecting to stand props when they were needed, and he gave it as his opinion that Powell and Singleman were equally to blame for this accident. Andrew Singleman was of German nationality, and left a widow with five children in extreme poverty, to mourn his untimely death.

Accident No. 11.—John Sheridan, a laborer working with his father, William Sheridan, at the Twin shaft, Pittston Coal Company, Pittston borough, was instantly killed, May 8th, by a fall of roof "immediately after firing a blast." This accident occurred in an air-way, twenty-feet wide. The rock that fell was a fearfully large bowlder, twenty-eight feet long, six feet wide and an average of two and a half feet thick. There was a well developed slant running parallel with the air-way a little to the right of the centre, and another running on the right hand side to meet it, and at the point of intersection the bowlder was about five feet thick. There had been but one small prop under this, and that single prop had just been discharged by a blast only two or three minutes before the rock fell. The young man rushed in ahead of his father to clear the track of coal that had been thrown there by the blast, and just as he got about half way to the face, the immense bowlder fell on him, crushing him to death on the instant.

William Harrison, the mine boss, had been in the place about an hour before the accident and he says: "I had noticed the slant running near the middle of the air-way, and I told Sheridan to watch it as the upper end of it was heavy, and I cautioned him to be very careful not to knock out the prop." He did not order him to stand more timber under it, however, as it was plainly his duty to do. I cannot, therefore, do less than attach the responsibility for this accident on the mine boss. He should have known better than to allow such a bowlder as this to hang over the road with only one prop under it and that one being liable to be knocked out with every blast. The miner also was very reckless and negligent, but he has been fearfully punished in the untimely death of a fine son. John Sheridan was an American, born of Irish parents, and was seventeen years of age.

Accident No. 12.—Peter Jordan, a laborer, working for David H. Thomas and John O. Thomas, Pierce colliery, Pierce Coal Company, Archbald borough, was fatally injured, June 1st, by a fall of roof. This accident was at first considered but slight, and was so reported; but on the 7th I was notified that Jordan had died of his injuries. At this colliery there is a clod immediately overlying the coal which is generally three to four inches thick, and this is quite treacherous as it sometimes sticks to the roof rock, and at other times parts. The mine boss, David H. Jones, had been in the chamber about half an hour before the accident and noticed that the clod had parted and was heavy and had ordered the miners to bar it down and to stand some props. They proceeded at once to carry out his orders, and when barring down the clod near the face it fell down the road for twenty-five feet, and clear across the chamber. David H. Thomas, the miner who was barring down the clod, hearing it working, ordered the laborers and his partner back out of danger, and Jordan was running away when he was caught by the fall. These miners have an excellent reputation for being unusually careful, and their chamber was well timbered, and perhaps this may be classed as an accident in the true sense of the term. Peter Jordan was of Irish nationality and left a widow with six children to mourn his loss.

ACCIDENT No. 13.—Patrick Barrett, a laborer, working for his brother, William Barrett, at the Cayuga shaft, Delaware, Lackawanna and Western Railroad Company, Providence, was killed, June 2, by a fall of top coal. This chamber was well timbered and the roof well secured; but the miner had worked the bottom bench forward too far, leaving a large quantity of the top coal hanging across the chamber, and as this top coal was considerably cut up with slips, it was very dangerous. A blast had been fired on one side of the chamber, breaking this coal through to a slip and starting it clear across the chamber to the pillar. The miner had just commenced to drill a hole on the pillar side, in order to bring it all down. In the meantime, Patrick Barrett went under it, for some purpose or another, and the whole mass fell on him, injuring him so that he died before reaching his home. Both men, in this case, acted very thoughtlessly, and as the surviving brother said—"It was a bad job, altogether." The top coal had not been examined, nor did either of the men pay any attention to what the other was doing. Had they given a moment's thought to the condition of the overhanging coal, the unfortunate man would not have taken the world for going under it, nor would his brother have allowed him to do so. Patrick Barrett was of Irish nationality, and left a widow with two children.

ACCIDENT No. 14.—Evan Jermyn, a miner, at the Von Storch slope, Delaware and Hudson Canal Company, Providence, was instantly killed, June 7, by a fall of bony coal. The chamber, in which this accident occurred, was as safe an one as any man ever worked in, and was unusually well timbered. Jermyn was drilling a hole on the back of a slip which his brother had nearly drilled far enough. He took his brother's place, and as he was getting down on his knees, the bony bench, from between the top and bottom tiers of coal, fell on his head, crushing him to death. This unfortunate man, though usually very careful, met his death through his own neglect. Had he examined the bony as he should have done, before going under it, he would have barred it down, and thus would have saved his life. Evan Jermyn was of Welsh nationality, and left a widow with three children.

Accident No. 17.—Patrick Dougher, a laborer, working for Peter Munley, at the Elk Hill colliery, Elk Hill Coal and Iron Company, Dickson City borough, was instantly killed, August 16, by a fall of bony and coal. The miner asserted that he had examined the bony in the morning, but admitted that he did not examine it after firing a blast that inevitably tended to weaken it. A large mass of it was still hanging when I went there to investigate the cause of the accident, and the mine boss, John G. Wieland, barred down a large quantity of it, at my request, and in my presence—enough to kill a dozen more men, had it fallen on them. The chamber was in a very unsafe condition, and I am sorry to say, that in my opinion, the miner was criminally to blame for the untimely death of his laborer. Patrick Dougher was of Irish nationality, and left a widow with four children, in very poor circumstances, to mourn his death.

Accident No. 18.—Michael Reap, a miner, at the Central Shaft, Delaware, Lackawanna and Western Railroad Company, Hyde Park, was fatally injured, August 23, by fall of bony coal "immediately after firing a blast." The accident happened about half past seven, a. m., and Reap died at half past four, p. m., the same day. He had just fired a blast in the bottom bench, in the center of the chamber, pointing toward a slip which was running parallel with the chamber, there being another slip just seven feet away, running in the same direction. Over the bottom bench there was a tier of bony coal seven inches thick, with a fine smooth over it, and this is what fell on Reap with the result stated. As soon as he fired the blast he rushed into the face of his chamber, and without examining the over-hanging bony, he was in the act of creeping under it, when it dropped on him. It was said, that he was in the habit of rushing back into the face of his chamber immediately after firing blasts, which no miner should ever do; though many are guilty of the indiscretion every day, and the practice results in several deaths annually. This man lost his life through his own neglect, and no one can be held responsible but himself. Michael Reap was of Irish nationality, and left a widow with five children, all of whom are small and helpless.

Accident No. 19.—David Davies, a laborer, working with his father, David Davies, at the Brisbin shaft, Delaware, Lackawanna and Western Railroad Company, Providence, was killed, August 31, by a fall of roof. The roof in this chamber was not extra good, being considerably cut up with slants; but it was well timbered, and the miner, apparently, was usually very careful. In this instance, however, he neglected to exercise his usual care, for, after firing a heavy blast in the top coal, he neglected to examine the roof, as he should have done. Had he done so, he could not have failed to detect the dangerous slab of rock, and he would have barred it down, thus saving the life of his boy. David Davies was of Welsh nationality, and was a single man.

ACCIDENT No. 21.—Felix Slavin and John Dougherty, miners at the Filer colliery, Messrs. Filer and Livey, Winton borough, were instantly killed, September 16, by a fall of roof. The roof proper in this place was excellent, consisting of solid, unbroken, sand rock. The mass that fell, killing these unfortunate men, was a clod immediately overlying the coal, which was generally taken down, because it was not safe to attempt to timber it. The surface area of that which fell was seventy square feet, and it was about eight inches thick. The men had been repeatedly warned during the day and the day before by Thomas Finnerty, the miner in the adjoining chamber, that the clod was very dangerous, and that they should bar it down; but they disregarded every warning and advice, and went right on working under it until it finally fell on them, killing them instantly.

This accident was a very peculiar and effecting one in many respects. John Dougherty had been severely injured in the mines several times before, and was almost a helpless cripple. He was not a competent man to have charge of a chamber, and it is my candid opinion that he ought not to have been employed in the mines. His wife, as I am informed, is insane and is an inmate of the asylum for the insane, at Danville. Felix Slaven, certainly, should not have been employed in the mines, as he was totally blind. It is bad enough when men are employed in the mines who are afflicted with deafness, and I think none such should be employed; but what can be said to justify the employing of men as miners who are stone blind? The only reason given to justify the employing of these men by George Filer, Esquire, one of the firm, was, that they were so extremely poor, and that they begged so hard to be allowed to work, that he very reluctantly gave them employment. Feeling, however, that it was not right to allow them to work in the mines, Mr. Filer essayed to stop them several times, "but they begged so hard," he said, "that he let them have their own way." It is very hard to censure men who err, as Mr. Filer undoubtedly did in this instance, through generous sympathy for the poor; and, yet, my respect for the truth compels me to say that these men, in one sense, were killed through indiscreet kindness, and I most earnestly protest against the employment of such men in the mines.

John Dougherty was of Irish nationality, and left an insane widow; and Felix Slaven was also of Irish nationality, and left a widow with two children in extreme poverty.

ACCIDENT No. 22.—Edward Loughery, a miner at the No. 6 shaft, Pennsylvania Coal Company, Jenkins township, was fatally injured September 27 by a fall of top coal. The first notice received of this accident was that he had suffered a fracture of a leg below the knee, and that he was "not much injured otherwise;" but he was undoubtedly injured internally, as he died the same day. He was of Irish nationality, and was unmarried.

ACCIDENT No. 23.—Lewis T. Williams, a miner at the Diamond shaft, Delaware, Lackawanna and Western Railroad Company, Hyde Park, was instantly killed September 27, by a fall of roof, consisting of a clod overlying the top coal. He was engaged drawing back top coal, and had but just reached his working-place in the morning when he was killed. He went right straight to work without examining the place, which no miner should ever do. The mine boss, Rees T. Evans, said of him, " he was very reckless in his work, and I have had occasion many times to lecture him severely on account of his working in danger. Only a few days previous to this accident he and his laborer came very near losing their lives by a fall of about ten tons of top coal which he knew was dangerously hanging over them, and still neglected to make it secure. They were standing alongside of a car which they were loading, and had barely time to turn away when the mass of coal fell, breaking the car in two, and crushing it into a shapeless pile of wood and iron. I gave him a severe lecture at that time for his fearful recklessness, telling him that it was only a question of time when he would lose his life." A few years ago another man, who was laboring for him, was completely buried under a fall of about fifty tons of top coal through his neglect, though strange to say, notwithstanding that he lay under the coal for five hours before he was released, he escaped with comparatively slight injuries, being protected by a loaded car, by the side of which he lay imprisoned. Patrick McAndrews, the laborer who was employed by Williams, warned him on this occasion which proved fatal to him; but he paid no heed to the warning, and paid the penalty of his recklessness with his life. He was of Welsh nationality and left an aged widow.

ACCIDENT No. 25.—John O'Rourke, a miner at the Grassy Island shaft, Delaware and Hudson Canal Company, Olyphant borough, was fatally injured October 9 by a fall of top coal. He died of his injuries on reaching the top of the shaft. This man again was engaged in taking down top coal, had chopped out two props from under it—one on each side of the road—and was chopping a third when a large quantity of coal fell on him with the result stated. The top coal at this place was thirty-one inches thick, and at the immediate point where the fall occurred there was a slip running across the chamber which he had uncovered on the left side, thus making a loose end. In addition to this, the coal was quite brittle and free, so that extraordinary care was necessary in taking it down. It is very evident, however, that even ordinary care was not exercised by O'Rourke, for he must have known of the danger, and yet he preferred to take risks that no miner should take under any circumstance. He lost his life entirely through his own negligence, and no one can be blamed but himself. John O'Rourke was of Irish nationality, and left a widow with two children.

ACCIDENT No. 26.—John Wisce, a laborer, working for William Wethers and Benjamin Armstrong, at the No. 10 shaft, Pennsylvania Coal Company, Hughestown borough, was instantly killed October 15, by a fall of roof. The miners had just fired two blasts, and Wisce returned immediately into the chamber to clear the road of the coal thrown out by the blasts, when four hundred and forty square feet of the roof, three feet thick, fell on him, killing him instantly. Wethers, one of the miners, had gone into the chamber ahead of Wisce, and Armstrong told the laborers not to go in until the smoke had time to clear away. Wethers, however, on reaching the face, found that the smoke was not as thick as expected, and he resolved to work out the stub left by his blast. And just as he commenced working, the roof fell on the road back of him, and on looking back he called to Wisce, who answered only with a groan. In the meantime the roof of the whole chamber commenced working outside and all around Wethers, and he expected every moment that he, also, would be crushed to death. He escaped unharmed, however, and in about a minute after a second fall occurred, and this was immediately followed by a third fall, and this was the heaviest fall of all. The roof at this point consisted of a tier of bony coal, and over this the rock was very friable and broken up with clay seams and slants. Such roof requires liberal timbering, and in my opinion there was not more than half the timber there that should have been. There was but one row of props, and the timber in that row were too far apart. I am willing, charitably, to believe that the mine boss was satisfied that the place was well timbered, but I am positive that he erred in his judgment. John Wisce was an American, and left a widow with four children, in distressing circumstances, to mourn for him.

Accident No. 27.—James Compton, a miner at the Hyde Park shaft, Delaware, Lackawanna and Western Railroad Company, Hyde Park, was fatally injured, November 5th, by a fall of roof. He died of his injuries on the 9th. Compton was driving a gangway, and at the point where the accident occurred there was a vertical downthrow in the vein of eight feet; and, as is nearly always the case in rolls of this nature, the coal and overlying roof was considerably broken up with slants and seams, and it was a slab of this that fell on Compton. The laborer, Henry Thomas, says that "they had examined the place in the morning, and again several times during the day, but had detected no danger there."

It seems passing strange that an accident could occur in such a narrow place as this was, had ordinary care been exercised to ascertain the condition of the roof. It is very evident that danger was suspected there, or they would not have examined that spot so many times during that morning, as testified to by Henry Thomas. The examinations that were made must have been very careless and partial. Compton had the reputation, however, of being a careful and competent miner; but the fact is that old, experienced miners often take risks that an ordinary miner would shrink from, and we are often called upon to record the death of such men through the temporary suspension of their usual care. Compton was of Welsh nationality, and left a widow only.

Accident No. 28.—Daniel H. Stevens, a miner at the Green Ridge slope, Green Ridge Coal Company, Dunmore borough, was fatally injured, November 12th, by a fall of roof. He died of his injuries the same day. He was opening a chamber off from another chamber road, and had entered into the solid twenty-two feet. The coal being only four and a half feet thick it was necessary to blast down the roof to make height for a mine car to pass in to the face. Stevens and his partner, Clarence Wisce, were engaged blasting down this roof when the accident occurred. They had just fired a blast about five minutes before, and Stevens rushed back immediately under a part of the rock that had been loosened by the blast, and persisted in going, nothwithstanding that his partner warned him that it was dangerous, and told him not to go under it. There was a small quantity of coal lying under the loose rock which he desired to move back before barring the rock down, and just as he commenced to move the coal the rock fell on him, with the result already stated. He lost his life entirely through his own recklessness, and no blame can be attached to anyone else. D. H. Stevens was an American, and left a widow with two children.

Accident No. 30.—Patrick Keating, a laborer, working for John Moran, at the Sloan shaft, Delaware, Lackawanna and Western Railroad Company, Lackawanna township, was fatally injured, November 23d, by a fall of roof. He died of his injuries December 1st. The chamber where this accident occurred was thirty feet wide, and the coal was eleven and a half feet thick. The extent of the fall was three hundred and twenty-three square feet, and consisted of the clod that overlies the big vein in many collieries, which at this place was three inches thick. I found this clod heavy back for many yards from the outer edge of that which fell, and in some places extending over the road. There were but few props under it, but, in my opinion, no attempt should ever be made to hold this clod with timber, as it will break all around props and fall between them, unless the props are stood very close together. The nearest prop to the face was twenty-two feet away at the time of the accident. The miner was undoubtedly to blame for allowing so large an area of rock hanging loose over the head of his laborer. It is a very poor excuse to say that it was not well known that the clod was dangerous, when no examination was made to ascertain whether it was or not. Keating did not appear to be seriously injured at the time, and I am informed that he was suffering from a disease which was aggravated by the shock of the accident, and that this was the main cause of his death. Patrick Keating was of Irish nationality, and left a widow with two children.

Accident No. 32.—Anthony Bradley, a laborer, working for John A. Andrews, at the Von Storch slope, Delaware and Hudson Canal Company, Providence, was fatally injured, November 26, by a fall of roof. The roof in this chamber was not good, and I am sorry to say it was poorly timbered. Bradley had a leg badly shattered at the knee and above it, had an arm fractured, and was injured also in the back. Nothing was done to stop the hemorrhage of the shattered limb until he was brought to his home, and he must have been fearfully weakened through loss of blood before anything was done for him. I have no doubt but many lives are lost for the want of proper care immediately following accidents, and I think that all parties having charge of men and boys in and around the mines should be instructed as to the proper treatment of persons injured, so that no more precious lives may be sacrificed through this general ignorance. Doctors O'Brien, Sullivan, and Hollister attended this case, and were about to amputate the shattered limb, but on announcing their intention to that effect in the hearing of the injured man, he was so shocked that he lost all heart and died. Anthony Bradley was of Irish nationality, and left a widow with two children.

ACCIDENT NO. 34.—Peter Wilson, a miner at the No. 12 shaft, Pennsylvania Coal Company Pleasant Valley borough, was instantly killed, December 13, by a fall of rock. The circumstances leading to this accident are described by Thomas Hailstone, the surviving miner, as follows: "We were taking down top coal in Ford's heading, and taking a skip back from the pillar. Had just fired two blasts in the top coal. After firing these two blasts, I went to prepare a place to drill a hole in the pillar, and Wilson was near by clearing rock and rubbish away to give my blast a chance to work. Just before going under the rock that fell, Wilson put his hand in the crack over it and said, 'This rock is sprung,' and I answered that I thought the bench of 'checker' would give warning before it would fall. The rock fell in about five minutes after we had this conversation. Neither of us examined it further than that Wilson put his hand over it as stated, nor did either of us try to bar it down. We relied on the 'checker' bench being strong enough to hold it up. There is no doubt but it could have been barred down very easily had we tried to do so, and it was a fatal mistake that we did not."

Two minutes' work would have prevented this sad accident, and this is true of the majority of them; and yet the miners continue to run the risk of losing their lives rather than do what they know would save them. This poor man was the victim of his own foolhardy negligence, and his partner was equally responsible. Peter Wilson was of Scotch nationality, and left a widow with six children in very destitute circumstances. The family was so extremely poor that they had no means to bury their dead.

ACCIDENT NO. 35.—Patrick Dearing, a miner at the Brennan colliery, Messrs. Brennan and Bridgett, Carbondale City, was fatally injured December 24, by a fall of roof. He suffered a compound fracture of a leg, and received internal injuries, from the effects of which he died the following day. He was engaged in taking out a pillar, but he was not an experienced miner enough for such dangerous work; he was too young a miner, and had only a boy working with him who was still younger and more inexperienced than himself. In one sense there was no one responsible for his death but himself, as it was his business to see that the roof was safe, and as he was there continually he ought to have been the best judge of its condition. The mine boss, John Killian, had been there only a few minutes before the accident, as had Patrick Flannery also, Dearing's stepfather, but neither of them had noticed any danger there. But I cannot believe but that a proper examination would have revealed the dangerous condition of the roof. The surface area of that which fell was seventy-seven square feet, and it was about a foot thick. There was a large mass still hanging when I was there to investigate the cause of the accident which was barred down by the mine boss, in my presence, and by my order. I must pronounce it wrong to employ so young a miner to rob pillars; it is very dangerous work at best, and none but the most careful and most experienced miners should be employed at it. This is the first fatal accident that has occurred at this colliery, though it has been running on a small scale for six years. Patrick Dearing was of Irish nationality, unmarried, and was a young man of excellent character, highly respected by all who knew him.

DEATHS FROM FALLING DOWN SHAFTS.

There was but one fatal accident from falling down shafts that can be charged to mining coal. An insurance agent, F. W. Rice, Esq., fell down the Leggett Creek shaft, Providence, on the 14th of April, and was instantly killed, but I have not classed this as a mine accident, chargeable to the business of mining coal and preparing it for market. There was one other, however, which is two and seven-tenth per cent. of the whole number of fatal accidents for the year.

Accident No. 5.—Isaac Davies, a miner at the No. 1 Barnum shaft, Pennsylvania Coal Company, Pittston borough, was killed March 17, by falling from the bucket as he was being hoisted up the shaft. He was engaged, just before the accident, in pumping water from a sump which was being sunk, and he was soaked through with ice cold water falling down the shaft. He complained to the men working with him of being so cold that he must ascend the shaft to warm himself. On being told to go, he signalled for the bucket and got on, standing on the edge, and when up about seventy feet, through some mishap, he fell to the bottom and was so severely crushed that he only lived for about thirty minutes after he was brought to the surface. I think he became so numb with the cold when being hoisted on the bucket, that he lost his hold of the rope and fell. He was a fine old gentleman, fifty-eight years of age, and was very highly esteemed by all who knew him. He was of Welsh nationality, and left a widow with seven children to mourn his death. The children, however, are mostly all grown up—two of them married.

DEATHS FROM BEING CRUSHED BY MINE CARS.

There were four deaths from being crushed by mine cars during the year, being ten and eight tenth per cent. of the whole number from all causes. The number of fatal accidents from this cause is considerably reduced as compared to the record of 1879; but they can be reduced still further if drivers, runners, door-boys, and even men will but use their senses to avoid them.

ACCIDENT No. 1.—David McGovern, a door-tender, at the Marvine shaft, Delaware and Hudson Canal Company, Providence, was instantly killed, February 16, by being crushed between a car and pillar. This unfortunate boy was away from his post of duty with one of the drivers, James McCartney, who asked him to go with him for the water car. McCartney put him on the mule's back to ride in, and when they reached the car he ordered the boy to hitch on the mule; then McGovern went on out ahead of the car, leading the mule for a short distance, but he finally stopped in a very narrow place with the intention of jumping on the forward bumper of the car to ride, and in attempting to do so, his foot missed the bumper, and the top rail of the car caught his head crushing it against the pillar and tearing the top of his skull clear off. The boy was in the habit of running around the chambers and away from his door with the drivers, and especially with McCartney, who enticed him away on this fatal occasion, and seemed to make a practice of ordering the little fellow around at his pleasure. If boys would attend strictly to their own work, and do it themselves instead of ordering one another to do that which does not belong to them, there would never be an accident of this kind. The mine bosses are not blameless in this matter. J. Y. Birtley, the mine boss, in charge of this colliery, says: "I have repeatedly ordered the door-tenders never to leave their doors for any one." And yet he sends them away on errands himself whenever he finds it convenient. He did this the day following this accident, when I was present, and I called his attention, then, to his inconsistency. If mine bosses would but practice what they preach they would be more successful in averting accidents.

ACCIDENT No. 7.—Edward Watkins, a driver at the Brisbin shaft, Delaware, Lackawanna and Western Railroad Company, Providence, was fatally injured, March 29, by being crushed under a trip of empty mine cars. He died in a few minutes after he was conveyed to his home. He was driving a team of mules and had them hitched to a trip of eleven cars, when the mules started and ran away down a steep grade that required two sprags in each car. The mules ran until they reached the chambers, Watkins hanging on to the harness of the hind mule all the way; but he finally lost his light and fell before the trip, and the two forward cars ran over him, and when he was found he was lying under the third car. The forward cars jumped the track and discharged a prop on the road-side which made the place extremely dangerous to go to his rescue. The men who were present, however, made all haste to get him from under the car, notwithstanding the roof was cracking fearfully over their heads; and they had only just moved him away a few yards when a large quantity of the roof fell just where the boy was lying. These mules, or rather one of them, was in the habit of running away; they would balk, and when they started they would run as hard as they could. As far as possible, all such fractious mules should be banished out of the mines, and if I could I would do this at once. I am happy to state that some of our most efficient superintendents do not keep an unruly, fractious mule in their mines for an hour after they find they are dangerous and unsafe for boys to handle. This is as it should be, and is a credit to the men who act thus humanely.

Accident No. 29.—William Mason, a driver at the Eddy Creek shaft, Delaware and Hudson Canal Company, Olyphant borough, was fatally injured, November 20, by being crushed by a trip of loaded mine cars, and died the same evening. This boy was employed running cars from a branch to the foot of the shaft. Just outside of the branch latches there was a sharp down grade, causing the cars to run about as fast as a mule can trot, and the boy was forced to run alongside of his mule before the trip down this run. There was a strap attached to the hames of the harness for the boy to hang to; but if he should happen to stumble and lose his hold on that strap, he would be very liable to fall under the cars. How he lost his hold of the strap in this instance is not known, but it is known that he did not have hold of it, and that he fell and lost his life. He was dragged by the cars for thirty-eight feet from the spot where he fell, which indicates that the trip was running at a high rate of speed, and the trip stopped only when the boy's body threw the forward car off the track. I have no hesitation in saying that some safer way should be devised to bring out the coal, and that boys should not be compelled to risk their lives by running at a break-neck pace down runs in front of heavy trips of loaded cars.

An inquest was held on this accident, William Williamson, J. P., acting as coroner; and from the evidence adduced, the jury, which was an unusually intelligent one, returned a verdict in accordance with the above facts, and severely censured the officials of the colliery for putting boys to work in such a dangerous place, where they must be continually in jeopardy of their lives.

Accident No. 36.—Michael Murphy, a culm-man at the White Oak colliery, Delaware and Hudson Canal Company, Archbald borough, was instantly killed, December 29, by being crushed between a car and pillar. A car of coal had been dumped by the side of the road belonging to some one of the miners, and as this was the last working day for the month it was desirable to load this coal so that it could be credited to the miner in his month's account. Murphy, therefore, instead of waiting for the noon hour, in company with Thomas Kelley, the driver boss, got an empty car and attempted to load the coal between two trips. The car was standing on the empty track at the end of a long passing branch; it was standing near the frog, and while they were loading the car a trip of five loaded cars was lowered to the foot of a self-acting plane, thirty-eight yards inside of where the car stood, and the footman called to them, inquiring if they were out of the way, and he was answered that it was all right. He then unhitched the rope from the trip and let it run down grade towards them. When the trip came near, Thomas Kelley saw that it would surely strike the car they were loading, and he called to Murphy, telling him to get back out of the way; but Murphy, instead of heeding Kelley's warning, jumped between the car and the pillar, and when the loaded trip struck the car it was knocked off the track and against Murphy, crushing him to death between it and the pillar. Murphy and Kelley were both equally to blame for not making sure that there was room enough for the loaded trip to pass the car. They were both experienced men with handling cars, and no excuse can be advanced for their heedlessness. Michael Murphy was of Irish nationality, and left a widow with six children—five girls, and two of them are said to be invalids.

DEATH FROM EXPLOSIONS OF BLASTS AND POWDER.

There were three fatal accidents from explosions of blasts and powder, which is eight and one-tenth per centum of the whole number for the year from all causes. Each of these deaths resulted from inexcusable recklessness on the part of the victims themselves.

ACCIDENT No. 10.—James Howarth, a miner at the Taylor shaft, Delaware, Lackawanna and Western Railroad Company, Lackawanna township, was fatally injured, May 4th, by an explosion of a cartridge as he was charging a hole. The hole was not round, and as he tried to insert the cartridge he found that it refused to go to the far end of the hole and he then used the butt end of a drill to drive it home; the drill striking fire exploded the cartridge, burning him in the face and about the body, and injuring him very seriously otherwise, from which he suffered fearfully until the 21st, when death released him from his sufferings. He committed one of the most foolhardy, reckless, and inexcusable acts that a miner can be guilty of, and such as the common sense of every man ought to teach him is an act of inexcusable madness. Every miner knows this practice of ramming cartridges with the butt end of a drill to be extremely dangerous, and all will admit it, and yet, otherwise careful and intelligent men lose their lives every year by clinging to the dangerous practice. Why is it that men will not abandon dangerous practices which they know to be so fatal? James Howarth was of Welsh nationality and left a widow with four children to mourn his untimely end.

ACCIDENT No. 24.—Patrick H. Kelley, a miner, at Tripp's slope, Delaware, Lackawanna and Western Railroad Company, Hyde Park, was instantly killed, September 29th, by an explosion of a blast. On his first attempt to fire the blast it missed; he tried it the second time when it hung fire so that he evidently thought it had missed again, and under this impression he started to apply a match the third time, but when within about ten feet of the face the blast exploded, throwing about two car loads of coal right in his face. The blast knocked out a prop also, and that fell on him. He was of Irish nationality, unmarried.

ACCIDENT No. 33.—John C. Nealon, a miner at the Eddy Creek shaft, Delaware and Hudson Canal Company, Olyphant borough, was almost instantly killed, November 29th, by a premature blast. He lived only for about two hours, but never uttered a word to explain the accident. His partner, Anthony Gannon, was present when he was killed, and gave the following statement: "Nealon had drilled a three feet hole before I got in to my work that morning, and he was coming down the road for powder to charge the hole when I got in; he returned with the powder and asked me to help him tamp the hole, and as the hole was wet, he told me to throw in the tamping as fast as I could. After tamping the hole I went down the road some distance and stopped to hold a light for him to run away from the blast; seeing him rather long in coming away, I said, 'Jack, what are you doing?' and just as I spoke the blast went off, blowing out my light. I then called to John Dunnigan, requesting him to bring me a light, and I told him I thought Nealon was killed with the blast. Thomas Monaghan then came and he and Dunnigan and I went up the chamber road to Nealon, whom we found back about two yards from where the blast went off, leaning up against the rib. His skull was fractured, and he was otherwise badly cut and bruised; he never spoke a word and died very soon after he was taken home.

"We do not use any patent squibs to fire blasts with; we fill straw squibs ourselves and make our own matches; the oil that we use in making matches is that which we burn, and is known as "black strap" or "green oil." That was what Nealon used to fire the blast which killed him. There was no smoke there before that blast was fired, as that was the first blast fired that morning; did not find any gas in the chamber that morning; do not know whether there was any gas in the hole or not; did not try it and do not know as Nealon did; we sometimes find a little gas in the holes, but not enough to hurt; have no safety squibs; we always fire the blasts with common paper matches."

Now, it is barely possible that the blast was exploded by gas, but the indications are that the match, being saturated with the "green oil" referred to by Gannon, was made in such a hurry, as the hole was wet, that when it was ignited it flashed instantly to the straw and exploded the blast. I repeatedly have called the attention of the miners to the danger of using any of the inferior oils lately introduced into the mines to make matches with; but they persist in doing it in spite of every warning, and it is a great wonder that more of them are not killed and maimed thereby. These inferior oils of all grades are becoming insufferable nuisances in the mines in many respects, and I anticipate that the use of them must be prohibited.

Hugh Jones, the mine boss, gave these miners a very bad reputation for being careless and reckless in their work, and said: "I have had great trouble with them trying to induce them to keep their working place safe. They were very reckless in relation to propping. Only a short time before this accident I found them both working under an immense slab of rock on entering their chamber, and I ordered them out from under it instantly. On putting a bar over the slab, it fell over a large portion of the chamber, covering the spot where they were located, each drilling a hole. I am sure that they would both have been killed on that occasion had I not gone into their chamber just when I did. I was in great doubt as to the propriety and safety of allowing them to work a chamber."

John C. Nealon was of Irish nationality, and left a widow with eight children in very destitute circumstances. The family consisted of four boys and four girls. The oldest boy, about twenty years of age, had always been a helpless cripple, and I am informed that he died in a few days after the death of his father.

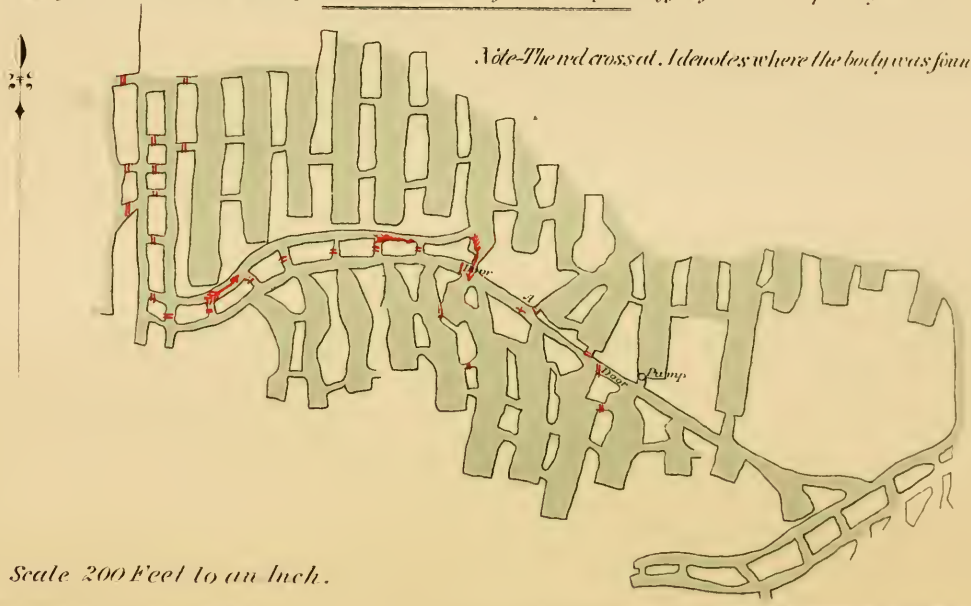
DEATHS FROM MISCELLANEOUS CAUSES UNDERGROUND.

There was but one fatal accident under the above head during the year, being two and seven tenths per centum of the whole number.

ACCIDENT No. 15.—Patrick Flynn, a pumpman at the Leggitt's creek shaft, Delaware and Hudson Canal Company, Providence, was burned to death July 11 by his clothing taking fire from his lamp. This accident occurred on Sunday, and I was apprised of it about four o'clock by two men from Providence, who desired me to go to the scene of the accident at once to investigate its cause; but learning from them that the remains of Flynn had been brought out, and that no danger was apprehended to anyone else, there seemed to be no necessity for my immediate presence at the mines, hence I made an appointment to meet the parties at the colliery the following morning. In the mean time some meddlesome parties had been very busy spreading a report that an explosion of gas had occurred, and that this asserted explosion was the cause of Flynn's death. On learning of this report I advised the man's friends, amongst them his brother, to see coroner N. Y. Leet and request him to hold an inquisition in the case, so as to investigate the matter thoroughly as to whether there had been an explosion or not. I was desirous to give the unfortunate man's friends the fullest opportunity to inquire into the case to their entire satisfaction. An inquisition was finally held by Coroner Leet, and the investigation was about the most thorough and exhaustive of any held during my term of service; but there was not a particle of evidence adduced to sustain the theory of an explosion of gas having occurred there, and I positively *know* that there was no explosion of gas, as there was not the least sign of anything of the kind anywhere in the vicinity of the location where the man was burned to death. By referring to the accompanying plan of the workings, it will be seen that he was burned to death at the point "A," which is on the main road, and between the two doors in the intake current of fresh air. Had there been an explosion it would have been utterly impossible for these doors to escape destruction; but the doors were wholly undisturbed. Nor were there any other indication of an explosion, such as brattice or stoppings disturbed, or even so much as any dust raised, as is always the case where explosions occur. Then again, George Archbald, the fire boss for that section, had passed the point where Flynn was burned only about two minutes ahead of him, and when Flynn's clothing took fire Archibald was just passing through the inner door, and was, therefore, nearer the only point in the vicinity where the least color of gas had been found at any time. Had there been an explosion he could not have escaped

PLAN
OF
SECTION OF LEGGITT'S CREEK SHAFT WORKINGS D.&H.C.Co.
PROVIDENCE PA.

Showing the location where Patrick Flynn was burned to death by his clothing taking fire from his lamp, July 11. 1880.



Note—The red cross at A denotes where the body was found.

Scale 200 Feet to an Inch.

unhurt; but he was not injured, and positively swears that there was no explosion. Now, before presenting any theory as to the manner in which Flynn's clothing took fire, I deem it proper to put on record the testimony given by the most important witnesses on my examination.

George Archbald, *sworn*:—My name is George Archbald; reside in Providence; am fire boss by occupation, and am employed as such at the Leggitt's Creek shaft; was at work yesterday (Sunday) morning; entered the mine to the foot of the shaft in company with Patrick Flynn, George Green, Michael Cannon, William Kelley, James McManina, and his son, James. When we reached the bottom of the shaft. I first went to the barn, which I examined, finding it all safe; thence I went into William Campbell's heading to examine that place, to ascertain whether it was free from gas or not, so that Patrick Flynn could go in there to work. Found no gas anywhere near the main road, and found none anywhere, excepting a little in the face of the nearest chamber but one to where Flynn was burned. Had not been in that chamber that morning until after the accident. It was after the accident that I found gas there. Did not find more than three or four inches there, extending across the face of the chamber and tailing out about four yards from the face. This chamber was dipping all along until a short time ago, but it is now rising, which accounts for the gas lodging there. Never found any gas there until the chamber struck the rise. The return air does not come out through the heading where Flynn was burned. Do not think it possible for the gas to be dislodged from that chamber and then re-lodge on the main road. The gas, if dislodged, would go across the outside chambers, and would pass the point where the accident occurred, a long distance away. I examined the place where Flynn was burned as I went in ahead of him, and there was no sign of gas there. Flynn and I went in together from the foot of the shaft. I had a safety-lamp and Flynn carried a common miner's lamp. He was following, perhaps, thirty or forty yards behind me. He was sometimes all of fifty yards behind, as he was lame and could not get along as fast as I could. I was forty or fifty yards from him when his clothing took fire. The first I knew of it was hearing him call, "George! George!" and then I looked back and saw him enveloped in flame. I then ran down to the sump to look for a bucket or a keg to carry water to throw on him, to extinguish the fire, but I failed to find anything, and I then tried to get near him but could not get near him because of the intense heat. His clothing were all on fire. Then I ran back and forth for some time, and I was so excited that I could not take particular notice of anything. He did not say anything, except calling my name twice, as I have already stated. When I found that I could do nothing for him, I got my lamp, which I had dropped, extinguishing the light, and went out in the dark to where I had left George Green, on the main road, about seven hundred feet from where the accident occurred. I told him that Flynn was burned to death. Green and I then returned together, along another route, to try to approach Flynn; but when we got to the door, just outside of where he lay, and on opening the door, we found the stench so great from his burning flesh that we could not possibly approach him, and by this time I was sure that he was dead. I then went to the foot of the shaft with Green, whom I sent out to inform the mine boss, Finlay Ross, of the accident.

I have no idea as to how Flynn's clothing got on fire. Did not see his clothing taking fire. He was enveloped in flame when I first saw him. He usually had on considerable clothing. Had a linen water-proof coat on yesterday morning, and I am very sure he had another coat on under that. His clothing was fearfully soaked with oil. Think there must have been as much as two gallons of oil in his clothing, and he usually carried a large quantity of oily cotton waste on his person, which he used to gather up in the engine-rooms outside, and which he would cram into his pockets and into his breast. Have seen him have large lumps of tallow hid away in his breast. Do not know whether he had any oily waste or tallow stuffed in his breast yesterday morning or not, but he did have his pockets full of waste. On my asking him for some to wipe my safety lamp, he pulled a large quantity out of his pockets in search of a bunch that was comparatively clean, which he handed to me, and he then crammed the balance back into his pockets again. He also had a pint bottle full of kerosene oil in his pocket, and I think he had two bottles. He had no need to carry oil in to his work in that manner, as oil was furnished to him by the company by the gallon

GEORGE GREEN, *sworn:* My name is George Green. Live in Providence. Am water-bailer by occupation, and work in Leggitt's Creek shaft. Started in to my work yesterday morning with Archbald, the fire-boss, and Patrick Flynn. On the way in I stopped at the "Y," by order of the fire-boss. Stayed there, and heard nothing of Archbald and Flynn, only the slamming of the doors as they passed through them. There was no indication of an explosion—no concussion in the air. The slamming of the doors that I heard was not caused by concussion of an explosion, but was caused simply by passing through them, as I have heard them often. Archibald, the fire-boss, came back to me after a while, and as he approached me he called for a light; he then told me that Flynn's clothing had taken fire in some way, and that he was burned to death. Archbald and I then went back together and tried to approach the place where Flynn lay, but we could not get near him for the suffocating stench of his burning body and clothing. We then returned to the foot of the shaft, and Archbald sent me up the shaft to inform Mr. Finlay Ross of the accident. I have heard the testimony of George Archbald, the fire-boss, and can only confirm all that he has said concerning the oily condition of Flynn's clothing, and in relation to his carrying oily cotton-waste to work in his pockets and on his person.

FINLAY ROSS, *sworn:* My name is Finlay Ross; reside in Providence; am mine boss by occupation, and have charge of the inside workings of

Leggitt's Creek shaft. I have heard all the testimony of George Archbald, and, from my own knowledge of the filthy, oily condition of Patrick Flynn's clothing, I know his testimony to be strictly true. About two weeks ago, Mr. Atherton, the outside foreman, and I spoke to Flynn of his clothing, telling him that he would get on fire some day, and make a bonfire of himself. I do not know how his clothing caught fire, but I do know that there was no explosion of gas; there could be no gas there to explode."

John Holleren, *sworn:* My name is John Holleren; reside in Providence; am stationary engineer at second opening to Leggitt's Creek shaft; knew Patrick Flynn; he was in the habit of coming in here and gathering all the oily cotton waste that he could find around the engine-room and carry it away with him into the mines; he also carried oil away; would take any oil he could find; would take this white oil which we burn, and what we call "black strap."

Mr. Holleren then showed me a sample of the oil which he had in a lamp. It was intensely inflammable, and should never be used in the mines. Now, notwithstanding the critical and exhaustive examination made by me into this case, there were parties who persisted in asserting that an explosion did occur, and I was very glad that an inquest was held. The jury found that Patrick Flynn came to his death by his clothing taking fire in some manner to the jury unknown.

My theory as to how his clothing caught fire is as follows: Before he and the fire boss started from the foot of the shaft he drew a large quantity of oily cotton waste out of his pocket in search of a clean bunch to hand to Archbald to wipe his safety lamp with. In returning the old waste back into his pocket he left some of it hanging out by his side, and in going in this caught fire from his lamp which he carried in his hand, and when he passed through the door just outside of where he was burned, and when opposite the entrance just inside of said door, (see plan,) the strong current of air coming in through that entrance fanned the fire into a flame and he was enveloped with a sheet of flame before he was aware of it. I have no doubt but that this was how he caught fire. He must have caught fire from his lamp, as there was no other fire near him. A portion of his pants was unconsumed, and a match was set to this by the coroner at the inquest to demonstrate how inflammable the oils were with which Flynn's clothing were saturated.

The only sense in which the law was violated in the case was, in permitting Flynn to enter the colliery before the workings had been examined by "the mine boss or his assistant." The eighth section of the act of March 3, 1870, provides for and requires such an examination to be made, and says: "And the workmen *shall not enter* the mine until such examination has been made and reported, and the cause of danger, if any exist, be removed." George Archbald, though an intelligent man, and a man of fine disposition, in my humble opinion, is not self-possessed enough for a safe fire boss. He evidently became so excited in this emergency that he was utterly incapable to render any assistance to the unfortunate man, even if that was possible. This, however, is undoubtedly a constitutional weakness in him, and he is to be pitied for it rather than to be censured. Patrick Flynn was of Irish nationality, unmarried.

DEATHS FROM MISCELLANEOUS CAUSES ON THE SURFACE.

There were three fatal accidents on the surface during the year, being eight and one tenth per centum of the whole number. All of these were boys; two of them were killed by screens in the breakers, and the third was crushed to death between big cars and chutes. Each of them was away from his proper place.

ACCIDENT No. 16.—David Powell, a slate picker, at the Pyne shaft breaker, Delaware, Lackawanna and Western Railroad Company, Old Forge township, was instantly killed, July 13, by falling on one of the main screens. Notwithstanding that the screens were fenced off this boy managed to fall on it and lose his life; he fell while sliding down a railing put to protect a stairway leading by the screen, and had no one to blame for his untimely fate but himself. It is next to impossible to keep the boys out of danger when they are employed about the machinery in breakers. They will go where they have no business in spite of all that can be done to keep them out of danger. David Powell was of Welsh nationality, and was thirteen years of age.

ACCIDENT No. 20.—Charles E. White, a slate picker, at the Elk Hill colliery breaker, Elk Hill Coal and Iron Company, Dickson City borough, was fatally injured, September 1, by being caught in the cog-wheels of a pony screen; he lived only an hour and a half after receiving his injuries. From the testimony of the boys who were close by when the accident occurred, the little fellow was leaning on the fencing surrounding the cog-wheels, and was poking his hand at the wheel, apparently to see how near he could come to the cogs, and finally his fingers were caught and drawn in, then his hand and arm clear up to the shoulder, and even his side was drawn in until his body choked the wheels, thus stopping the screen. The slate picker boss on that side of the screen room, Charles Healey, saw the boy get caught and ran to the door of the screen room and cried to the engineer, Charles Cunningham, to stop the screens; but he says the screens were stopped by the belt slipping before he received any kind of a signal to stop the machinery. The boy's arm was literally ground into a pumice.

It is true that the little fellow had no business near the cog-wheels; but I must say that it is equally true that he ought not to be out of his mother's sight, and should never have been sent to work at his tender age in a breaker, his exact age being only seven years, four months, and eleven days! His parents, notwithstanding their terrible sorrow, cannot escape the just censure of an indignant and outraged public for sending a babe like this amongst the dangerous machinery of a coal breaker. I was informed that the boy's father was at work, and that he had three or four other boys working and earning wages, and, if this is true, as I have every reason to believe it is, then it cannot be said that this small child was put to work from necessity. Had he been the child of a poor widow, with starvation staring her and her little ones in the face, there might be some excuse for this, but as it is there is nothing to justify it.

The parties in charge of the breaker who employed the child are deserving of severe censure for allowing him to come around the breaker at all. I admit that there is no provision in the mine law prohibiting the employment of boys at any age at the collieries *outside* of the mines; but I hold that the common instinct of humanity ought to be more than sufficient to prevent the outrage; but, sad to say, it is not enough, and it is to be hoped that the Legislature will take the matter in hand at an early day.

Accident No. 31—James Merrigan, a slate picker at the Eaton colliery, Messrs. Jones, Simpson & Co., Archbald borough, was fatally injured November 25 by being crushed between the big cars and the bottom of the chutes at the breaker. This unfortunate boy was away from his work and had no business under the chutes where he was injured, and he bore the character of being such a wild boy that it was impossible to keep him out of danger. George W. Eaton, the breaker boss, had repeatedly warned him that he would surely get killed through his recklessness around the cars and machinery. It is next to impossible to suggest a remedy to prevent accidents to boys of this character, and perhaps the only effective remedy is to refuse to employ them either in the mines or about the breakers. Lack of discipline, however, has much to do with the wildness of boys, and with the heedlessness and recklessness of all classes in and about the mines, and until rigid discipline is wisely enforced we cannot hope to prevent accidents of this class. James Merrigan was of Irish nationality, died of his injuries on the 27th, in the fourteenth year of his age.

ACCIDENTS FROM EXPLOSIONS OF GAS.

It gives me great pleasure to say that I have no fatal or serious accidents to report from explosions of carbureted hydrogen gas during the whole of last year. The only casualties of any kind from this cause was entirely the result of inexcusable carelessness, and every one of them could have been avoided by the exercise of the most ordinary care. Four men were slightly burned by slight flashes; but none of them were disabled for more than a few days. This is very gratifying to me, and it is also very creditable to the superintendents and mine bosses who have charge of fiery collieries. In my former reports I have contended that accidents from explosions of gas can be and ought to be averted, and the record of last year in this district, in some measure at least, proves that I am correct; and I desire again to urge the necessity of sweeping ventilation as a sure preventive of gas explosions. Enough has been said in my reports for 1878 and 1879 to convince every unprejudiced mind of this fact, and I trust that no interested party will either ignore or forget what has been said. The time is rapidly approaching when the practicability of providing sufficient ventilation to prevent explosions in the mines will be conceded throughout the world, and when this is universally admitted these terrible explosions will cease.

PRESENT CONDITION OF THE COLLIERIES.

I am happy to be able to report that the condition of the collieries in the district, so far as ventilation is concerned, is on the whole satisfactory. There are but few poorly ventilated mines, and the number is being reduced each year.

The Delaware, Lackawanna and Western Railroad Company's mines are kept well in hand, there being only one or two that cannot be rated as first class. There is never any trouble with the mines of this company, for the gentlemen in charge of them have always shown a cheerful readiness to comply with the requirements of the ventilation act. They have one colliery at present, the Central shaft, where the volume of gas evolved is increasing to such an extent as to require an early addition to the quantity of air now provided for the workings. Gas stands in small quantity in several of the working places, and the workmen are in continual danger from explosions on a small scale. But they are driving to make a connection with the Oxford air-shaft, where, I am informed, they intend to erect a fan as soon as possible. This will provide all the ventilation they will need. The other collieries of this company are well provided with a liberal quantity of air, with the exception of Tripp's slope; and there is no cause for complaint, only occasionally, when the mine bosses neglect to conduct the air to the face of the workings.

The Delaware and Hudson Canal Company's mines have been greatly improved. They have only two collieries now in my district which are not well provided with ventilation, and neither of these is very bad, and I have been assured by A. H. Vandling, Esquire, that one of the collieries referred to will be provided with two fans as soon as they can be put in place this coming spring. These fans are intended for the Grassy Island shaft, Olyphant borough, and when they are erected, they cannot fail to produce ample ventilation for the colliery, if it will be properly utilized by the inside bosses. The other colliery referred to is the White Oak colliery, Archbald borough. This is an old colliery and nearly exhausted; and as the ventilation is not very bad, it would be unjust, perhaps, to require costly improvements to be made in it. The air now provided can be better utilized by attending to the inside air-courses. A shaft will soon be sunk, to take the place of this colliery, which, I am assured, will be provided with a fan from the start.

A. H. Vandling, Esquire, is entitled to great credit for doing so much to improve the ventilation of the collieries under his charge during the last four years, and it gives me great pleasure to award him the credit due him. I am free to admit, that I was impatient to have improvements inaugurated, especially in the collieries at Carbondale, for I found them in very bad condition; and, perhaps, I was too impatient under all the circumstances. I am aware that a great part of the expense incurred should have been charged to the account of years in the past, long before Mr. Vandling assumed the control of the mines, and this fact should be credited to him. He has always been found ready to admit the necessity of improving the mines, and has shown a desire to do everything possible for the health and safety of the workmen.

The Pennsylvania Coal Company's collieries stand about as they did one year ago. No material improvement has been effected in any of their old collieries. The new No. 1 Barnum shaft, however, is provided with a fan which will produce ample ventilation for this new colliery, and another fan will be provided for the No. 2 shaft. I am very sorry that I cannot report all the collieries of this company in as good condition as could be wished. John B. Smith, Esquire, the general agent of the company, has always treated me with uniform kindness, and has always professed a desire to improve the condition of the mines under his charge; but the mine superintendents have not seemed so ready to do what is needed. My remarks on the condition of these collieries in my report for 1879, will apply to them still.

The collieries of the smaller companies and operators in the district are in excellent condition as to ventilation, excepting the following: Everhart colliery, Jenkins' township; Beaver colliery, Pittston borough; Columbia mines, Pittston township; Hillside colliery, Pleasant Valley borough; Greenwood colliery, Lackawanna township; Elk Hill colliery, Dickson City borough; Filer colliery, Winton borough; Jermyn's shaft and slope, Jermyn borough; Brennan colliery, Fell township; and Forest City colliery, Forest City. Some of these have been improved during the year, but none of them will ever have good ventilation until they are provided with a fan in place of the miserable furnaces now in use in them. The workings are so shallow in these collieries that furnaces cannot ventilate them. None of these can be classed as very bad, excepting the Jermyn shaft and slope and the Brennan colliery.

An air shaft has been sunk for the Hillside colliery, Pleasant Valley, and as soon as connection is made with the workings a fan will be placed on this shaft, which will remove all cause for complaint in this case.

A new fan has been erected by Messrs. Jones, Simpson & Co., at the Eaton colliery, Archbald borough, which was sorely needed. This improvement will place the Eaton colliery in the first class as soon as the air courses are put in proper shape inside.

The main roads and traveling ways have been improved in many of the collieries, but there is a great deal yet to be done before they are all satisfactory in this respect. The importance of having clean and unobstructed roads is not realized by many of the mine bosses, but I am more convinced of it every day, and I am positively certain that many accidents to drivers and runners would be averted if the roads were kept reasonably clear of obstructions. All places where drivers are obliged to hitch and unhitch their mules from cars in motion, such as passing branches, the approaches to the foot of shafts or slopes, and inside at the chambers, should be cleared of all obstructions along the roadside over which the boys are liable to stumble and fall under the cars.

There has not been a single instance during the year of an operator failing to keep a good supply of timber on hand for propping, but I cannot say as much for the miners as regards using the timber. The large number of accidents reported from falls of roof go to show conclusively that propping is more neglected than anything else connected with the safety of the workmen. As I have noticed in each one of my reports, the miners themselves, under the direction of the mine bosses, are the parties who must assume the responsibility for every neglect in this respect. They can apply the remedy if they will, and no one else can. I cannot help it that mine bosses and miners take offense when they are told this truth, for so long as it is the undoubted truth it is my imperative duty to enunciate it, and they must submit to its enunciation until they receive it as truth and act accordingly. I do not believe in covering up inexcusable neglect through cowardly silence.

THE OBJECT OF SPLITTING THE AIR-CURRENTS.

In collieries where no explosive gas is generated, very little is ever done to insure the benefit arising from a judicious system of separate air-currents, and this is neglected in a great measure undoubtedly because it is not considered necessary. The general impression seems to prevail that air-splitting is only necessary where large and dangerous volumes of gas are evolved, and that the only object in doing it is to reduce the power of an explosion when it occurs. The fact that dividing the air into distinct and separate currents very materially increases the aggregate quantity of it for the workings of a colliery is either lost sight of or seems to be considered of such slight importance as not to demand any attention. All who understand the subject know that by enlarging the area through which the air is conducted an increase in the quantity is attained, and that it passes at a reduced velocity, thus immensely reducing the friction or drag, and consequently the power required to move it; and it is also known that the same result is obtained by judiciously multiplying the air courses for the air to travel. Formulas are given by experts in the science—by J. J. Atkinson, Fairley, and others—to demonstrate mathematically the utility of splitting the air into distinct and separate currents with a view of increasing its aggregate quantity, but I do not propose entering into an elaborate treatment of the subject at this time, as I only desire to call the attention of the proper parties to the matter, because I find it does not receive the attention that I think the importance of the subject demands.

Another object in splitting the air is to reduce the power of explosions when they occur, and to confine the explosion to the split in which it occurs. This is certainly a very important object, and it is intended to be the main object. In the 9th section of the act of March 3, 1870, we have the following provision: "And every mine having explosive gas in each and every part of such mine or mines shall be divided into two, four, or more panels or districts, each ventilated by a separate split or current of air, and fifty persons shall be the greatest number that shall work in any one panel or district at the same time." Now, this provision is very indefinite in many respects, and, in my opinion, the size of the district to be ventilated by each split should never be governed by the number of persons to be employed in it, but always by the quantity of gas generated therein, and other sanitary considerations. Where a colliery, or any part of a colliery, is very fiery, if it is intended to divide the power of an explosion, or if it is intended to confine it to the district or current of air in which it occurs, the number of persons employed there is certainly not the criterion to follow. There may be instances where a section of a colliery should be paneled off and ventilated separately in which not one person is employed, and I contend that no mine is safe where there are abandoned workings continually evolving large quantities of gas, and where this gas is allowed to accumulate for want of ventilation to dilute it and sweep it out of the mines. Such a mine is not "free from standing gas," and yet it is certain that many such mines are to be found, and that many of the most disastrous explosions on record have resulted from this very thing. Oceans of gas are walled in in old workings systematically, and so long as this is permitted explosions will never cease.

But does splitting the air really lessen the power of an explosion? In so far as it insures an increase in the ventilation for a given quantity of gas it certainly does, but where each split is allowed to reach as near the explosive point as the single current was before splitting, then decidedly not; and as tending to confine or localize an explosion in one section of the mine it is a complete failure. The doors, air crossings, and stoppings, as they are universally built, are far from being firm and strong enough to withstand the force even of a local explosion in any of the splits, and as long as collieries are operated with all the air currents so near the explosive point as to necessitate the universal use of safety lamps, it is very doubtful whether it is possible to build doors and stoppings strong enough to withstand an explosion. Air crossings, by driving them through the solid strata over or under the vein of coal, might possibly be made strong enough, and it may be possible to build stoppings even strong enough, but what about the doors? It is said that the strength of a chain is only equal to that of its weakest link, and the same principle is true in the matter under discussion. I am free to admit that I have never yet seen either doors, stoppings, or air bridges but would be easily blown away by an ordinary local explosion. The crossings, at best, are constructed partly of timber—frequently with timber floorings, and either timber or slight brick walls for sides—and the stoppings are of all kinds, from a common brattice of hemlock boards to a dry wall pointed with mortar, while the doors are all made of canvas or wood. In case of an explosion they are always blown away, and I doubt there being a single instance in the history of coal mining where they have answered the purpose of confining an explosion to one section of a fiery mine. Hence, the only way to insure the safety of the workmen in fiery collieries is by providing a sufficient quantity of pure air in numerous currents coursing through the workings to keep the atmosphere far above the explosive point, so that explosions cannot occur. Let the ventilation be divided into as many currents as circumstances will permit, but we should never rely on this to prevent explosions.

DRAGS ON CARS IN SLOPES.

Considerable discussion has been had throughout this district during last year, on this drag question. Some very readily acknowledge that drags ought to be attached to all cars in slopes, and admit that they would act as safety-catches for the protection of the employés at the bottom, and that they would pay for themselves many times over in a short time, in preventing cars being destroyed by runaways. Others acknowledge the need of them, but contend that one drag attached to the coupling of the last or hind car of a trip will answer the purpose; and a respectable number have adopted this kind of a drag, and have them now in use. These drags are double prongued, and must be put on by the footman as every trip is hoisted. These answer the purpose very well on slopes of slight grades, say from eight to ten degrees; but where the inclination is more than ten degrees there ought to be a drag on every car in order to do the work effectually. Still another class contend that they cannot be attached to mine cars, as they would interfere with the running of the cars so that they could not be used; that they would not answer the purpose intended if they were used; and that there are instances where they would be utterly worthless. It is asserted, for instance, that the drags will not hold cars on slopes inclining at an angle of forty to forty-five degrees; that the most they would do in such a case would be to throw the cars from the track; and that on such steep slopes the cars would pitch and tumble to the bottom about as rapidly as if they remained on the track. But this can be true only where the head-room is so high that the cars would go over the drags. Where the height from the thill to the roof is only a trifle greater than the height of a car, the drag would lift the car against the roof and hold it there, no matter what the angle of the slope may be. The drag has been in constant use in the Mount Pleasant slope, Hyde Park, for the last twenty-three years, and they have proved to be a grand success. This slope dips at an angle of thirty degrees, and I have seen a trip of three cars pinned against the roof, and held there by the drags, as shown on the accompanying plan. The rope parted with a trip of four loaded cars there only a few days ago, and the drags held the cars secure, and have never failed to do the work. And there are no slopes in this district where they would not work equally as well.

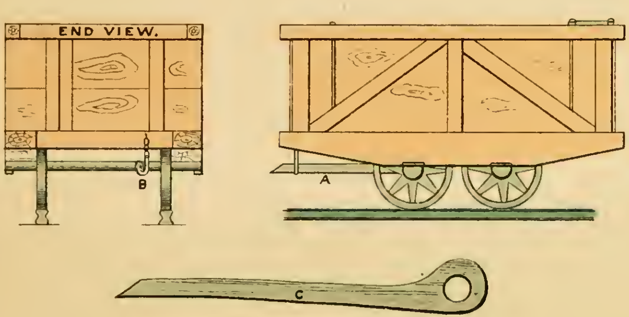
There are a few who oppose their introduction because they cannot be used on self-acting planes, or that they will not stop empty cars running away; but they are not intended for that, and every intelligent man knows that the danger of a rope parting with an empty trip, or even with a loaded trip, when being lowered down an incline, is nothing compared to that from

PLAN Showing Cars & Drag. Scale ¼ an Inch = one Foot.

REFERENCE: A. Drag when not in use.

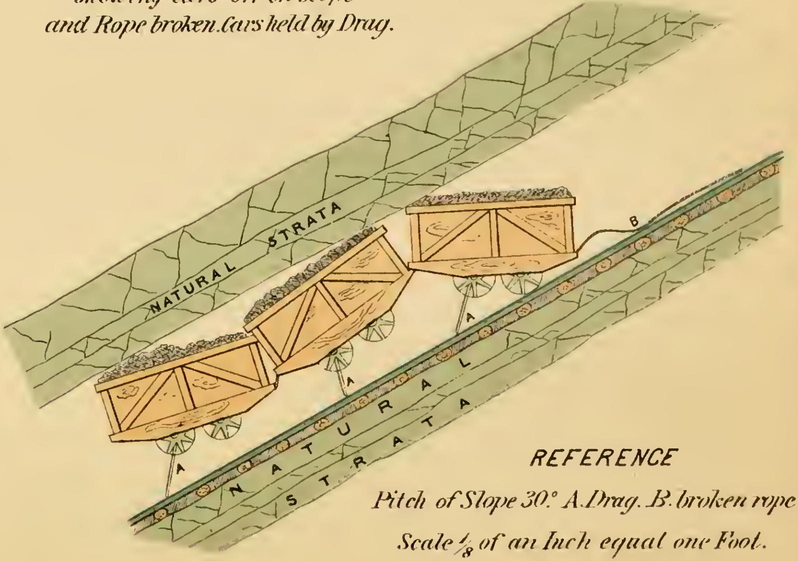
B. End view of Drag with hook to rest on.

C. Side view of Drag on large Scale.



PLAN

Showing cars off on slope
and Rope broken. Cars held by Drag.



REFERENCE

Pitch of Slope 30°. A. Drag. B. broken rope.

Scale ⅛ of an Inch equal one Foot.

hoisting. It is true that ropes sometimes do unaccountably break when an empty trip is being lowered, or when a loaded trip is being lowered on a self-acting plane; but such cases are very rare, while ropes breaking from hoisting are of frequent occurrence. It is asserted, also by this class, that in lowering trips the drags sometimes drop from their fastenings and throw the cars off, or stop them on the slope. Now, there may be isolated instances where this has occurred, but the only damage done in such a case, at the worst, would be a few minutes' delay. Evidently those who advance such arguments as these must be extremely hard pressed for tenable ground to stand on. Their theory seems to be that because we cannot prevent every accident, then no attempt should be made to prevent any. But I am positive that there is no necessity for this last thing to happen. If the hooks are properly made, and if the drag is properly hung on the hook, it will not become detached as asserted.

The only cases in which these drags will not act effectually as safety-catches, is where the head-room, from thill to roof, on steep slopes, is too high for the length of the drag to reach, and perhaps where carriages are used. This objection has force, so far as such slopes are concerned, but it is not valid against their introduction where it is known they will serve the purpose intended. Let some of our mechanical geniuses devise some other means to provide for these steep, high-roofed slopes, and for slope carriages, and let us have drags where they will answer the purpose, or let some one suggest something better than the drag.

Another objection advanced against them, is their cost. Now this is a very small item, and cannot amount to more than about two dollars per car for the iron, and work in making and putting them on, and I will repeat that they will pay for themselves in a very short time in saving cars from destruction. The assumption that they interfere with the running of the cars, or that they are in any manner in the way, or dangerous, is so absurd on its face that none but the ignorant will make the assertion. I would finally recommend all to visit the Mt. Pleasant slope, where these drags can be seen in operation, and I have no doubt the superintendents there will be glad to explain away every objection to their use.

The Butler Mine Fire.

The Butler mine fire, I am happy to state, is the only mine fire in my district, and it is safe to say, I think, that this fire is under perfect control, and must exhaust itself within its present boundary. So far as surface indications show, it remains much as it was one year ago, except, perhaps, the location where it began and north of that point, where it is grown cooler. In the open cut the snow lies without melting, showing that it has exhausted itself at that point also. Owing to the tunnel caving in about a year ago, it is accessible only in part. Here there are signs of combustion—heat and gas—but the superintendent feels very confident that the tunnel is a success, and that the further spread of the fire is checked. This is the only point where there can be any doubt about the check of the fire, and this should be diligently watched.

The situation in the workings beneath the fire in the Marcy vein is also improved. In my last report I mentioned the sinking of air-shafts near the face of the workings in the lower vein. These have since been enlarged, and two additional air-shafts have been sunk above the out-crop of the Pittston vein, which is on fire; and the aggregate area of the in-take for air now equals three hundred and twenty square feet, and the outlet or up-casts equal two hundred and eighty-five square feet, and the displacement of air in November last was three hundred and ten thousand cubic feet per minute. During the warm weather in summer, the air-currents were not so strong, and it was deemed advisable to move the fan from the main shaft to one of the air-shafts, to which steam was conducted through pipes for two thousand feet. This was a material improvement, and S. B. Bennett, esquire, the efficient superintendent, is entitled to great credit for his untiring energy and cheerful readiness to do all in his power to make the workings of the Marcy vein comfortable for his men to work in. The displacement of so large a volume of air has had very good effect in reducing the temperature of the workings in the Marcy vein, and no inconvenience is now felt, except that some of the men complain of the cold! At one time in the summer, the upper lift, although above the fire, become so heated on account of hot air, that ten chambers were temporarily stopped. Having coal accessible elsewhere, this, however, was no inconvenience.

On account of irregular grades of the inside mine roads, and consequent delays in moving the coal to the shaft, it is purposed to drive a tunnel from a point at the face of the present workings out to the surface, and next spring to lay a surface track for mine cars from the tunnel to the breaker. The tunnel will be about two hundred feet long, six and a half feet high by seven wide, and this, when finished, will form another inlet for air.

Collieries Worked into One Another.

In view of the many fires that are raging in the coal mines of the anthracite coal field, I think it is high time to stop the practice of working collieries indiscriminately through into each other. A good, strong, continuous, and unbroken pillar of coal should be left on the dividing lines between all collieries, so that in case of a fire, a mine may be flooded at once without interfering with the working of adjoining mines. As it is now, there are collieries that cannot be flooded without inundating as many as a half dozen others, and all because there is no barrier left between them to hold the water. And it must be admitted that this is the rule and not an exceptional case. Instead of continuing to work on this system, not only should the line between collieries be left intact, but the successive lifts in the same colliery ought to be kept distinct and separate as far as possible. The coal thus left can be all won when the colliery is being finally abandoned. I am firmly convinced that a change is very much needed in this respect all through the coal region, and perhaps it is more necessary as a safeguard against fire in the pitch veins than in the flat or horizontal. But there is another danger threatening the flat veins that is not so common to the other class. Take our collieries in the Lackawanna and Wyoming valleys; there are many of them that are now working under the beds of the Lackawanna and Susquehanna rivers, and in the near future the number will undoubtedly be greatly multiplied; and there is every reason to fear that, sooner or later, caves will occur, which will cause the bottom of these rivers to drop out and inundate the workings beneath their beds, and all workings adjoining them. In such a case, under the present system of working collieries through indiscriminately into one another, there is no possibility of preventing all of them being inundated.

About the only objections that are made against the change recommended is, that it would reduce the number of modes of egress in case of an accident requiring the use of such, and that it would prevent the passage of air from one colliery to the other, and that the coal thus left would be lost. But, as I have already intimated, the coal need not be lost, nor is it necessary to work down so fine as to close all connection between the collieries. Narrow openings can be driven through at the most convenient points, but have them in such shape that they can be firmly closed, if necessary, in a few minutes' time. This can be easily done, and the opening made strong enough to withstand an ocean of water in case of sudden flooding, or where flooding becomes necessary in order to extinguish fires. But, it is said that such a system of working would interfere with the passage of air from one colliery to another. Yes, it would effectually put an end to the objectionable practice of ventilating collieries consecutively with one continuous current of air, for there would be no openings to admit its passage; but instead of being an evil, this would be an improvement that is greatly needed. Every colliery would then have to be provided with pure air in place of the noxious and poisonous return air of its neighbor, and the sooner the change is made the better will it be for the health of the workmen.

There are collieries in this district that are in danger of being inundated as above stated, and my object in referring to the matter is to sound the alarm in time. If I had time I could name the collieries which are now exposed to this danger and explain their connections with other collieries adjoining, but I must be satisfied with simply calling attention to the matter in this hurried manner, trusting that no more is necessary.

New Colliery Improvements.

A number of new shafts have been sunk and other shafts and slopes extended to lower veins, and new breakers built during the year. Some of these were commenced in 1879 and were completed in 1880, while others were only commenced last year and are not yet finished. It will be seen from these improvements that the companies and operators are prepared for any increase that may come in the demand for coal.

No. 1, Barnum's Shaft.—This shaft was briefly noticed in my report for 1879, and no description of the shaft is at present needed. The first vein of coal worked is the "Checker vein," which is one hundred and twenty-seven feet from the surface to the bottom of the coal. The marketable coal in the vein is from six to eight feet in thickness, the coal being short-grained but of good quality. One heading has been driven east and another running west from the shaft, with air-ways running parallel to each, and each heading is driven a distance of seven hundred feet. The general course of the headings is about south seventy degrees west and north seventy degrees east. There are also two parallel headings or air-ways running from the east side of the shaft to connect with the No. 2 shaft, which is the second opening, a distance of seven hundred feet away. The inclination of the strata is irregular, running from dead level to an angle of thirteen degrees, and the course of the inclination is about south twenty degrees east. The shaft is down in a basin and the coal will therefore rise also in going northwest. The vein as yet makes but little water and but little carbureted hydrogen gas.

The second vein now being worked in this shaft is the Big vein, which is at this point from seven to nine feet thick. This coal is long-grained, clear, and of excellent quality. Two headings have been driven in this vein, also in the same general direction as those in the vein above, for about five hundred feet each way, with parallel air-ways, and a connection has also been made with the second opening, and the inclination of the strata is in every respect about the same as in the vein above. A heading and air-way have been driven north from the heading on the east side of the shaft in this vein for about two hundred and fifty feet for the purpose of testing the inclination of the strata in that direction which was found to range from dead level to four degrees. There is but little water as yet, but there is considerable carbureted hydrogen gas evolved. The ventilation is produced by an exhaust fan, 17.5 feet diameter and five feet face, and is run by a twenty-five horse-power horizontal engine. The pumping is done by a forty horse-power engine and two fifteen inch Plunger pumps.

The coal is hoisted by two forty horse-power engines, one of which is used to hoist from the upper and the other to hoist from the lower vein There are five boilers, thirty-six feet in length and thirty inches diameter to provide steam, and a place ready for five more in the boiler-room when they shall be found necessary. The breaker engine is forty horse-power, and the machinery in the breaker consists of one set of large breaker rolls, two sets of pony rolls, and twenty revolving screens for the preparation of all sizes of coal from grate to buckwheat. The breaker is excellently arranged for the cleaning of coal, having ample room for picking the coal near the top of the breaker before it enters the screens. The breaker is eighty feet high from the level of railroad track under the chutes to the mine track on top, and the distance from the shaft to the angle at the head of the breaker is about one hundred and eighty feet. The capacity of the breaker is from one thousand to one thousand two hundred tons per day. Everything about the breaker is now nearly finished, but it is not intended to run it until next spring.

NO. 2, BARNUM'S SHAFT.—This shaft is eight hundred feet away from No. 1 shaft, and is the second opening for the latter. It is twenty-one feet in length and ten feet wide, and is divided into spaces as follows: Two carriage ways, six feet each, and an upcast air space, eight by ten feet. The depth to the bottom of the seven feet vein is one hundred and fifty-one feet. The marketable coal at this point is seven feet thick, of good quality, and but little slate or bony coal in the vein. But little work has been done here as yet. The headings and air-ways are driven only about fifty yards from the foot of the shaft in either direction. It is connected with No. 1 shaft by the heading and air-way driven from the latter, as already stated.

The Big vein, or that known as the "Fourteen Feet" vein, is the lowest yet reached in this shaft also. The headings have been driven about fifty yards as in the upper vein. The shaft is down in a small basin or swamp, and is about nine feet lower than the highest point between it and No. 1. They have also encountered a second small basin on the southeast side, but they have driven through it to the rise on the opposite side, and by ripping some roof will have a good level road.

The coal is hoisted here by a forty horse-power engine, with three boilers of the usual dimensiens to provide steam. The water is disposed of by a small donkey pump, which shows that the water is not heavy. There is some gas here also; and the ventilation is produced, as yet, by the fan at No. 1 shaft. I am assured, however, that a fan will be immediately provided for this shaft similar in all respects to the one at the other shaft, which will enable them to ventilate the workings of each separately, as they should be.

The surface landing at this shaft is about eighty-five feet higher than the top of No. 1, and the coal will be taken to the top of the breaker over high trestling, as the breaker is intended to dispose of the coal mined in both shafts. Nothing but headings and air-ways have yet been driven in either shaft, but there are ninety-three men and boys employed there already, and the coal mined last year amounted to 30,316 tons.

Mosier Colliery.—This is a new shaft sunk by the Butler Colliery Company, under the supervision of S. B. Bennett, Esquire, the efficient superintendent of the Butler colliery. It is located on fifty-six acres of land owned by D. D. Mosier, Esquire, Hughestown borough, and lies north of No. 8 and No. 10 shafts of the Pennsylvania Coal Company, into whose workings a second opening will be made. Shaft is sunk through the Big vein to the bottom of the Marcy vein, a total depth of one hundred and seventy feet. The size is ten and a half by seventeen feet, which is divided into two hoisting ways and an upcast for air, the latter having an area of about sixty square feet—just about half what it should be. The pumping is to be done by a large Knowles' pattern plunger pump, the column pipe to be put in one corner of the upcast, which is another objectionable feature as regards the provision for ventilation, which is to be produced by a fan not yet constructed.

Ground was broken in sinking on April 29, and the sinking was completed September 25, 1830. There was first forty feet of fine sand, and then good rock to the Fourteen Feet vein, and from thence sixty-five feet of very hard rock to the Marcy vein. The sinking below the Big vein was done with Ingersoll's rock drills, and giant powder fired by electric battery. No headings have yet been driven except about the foot of the shaft, and what coal has been mined was hoisted to the surface with the bucket used in sinking. The Marcy vein at this point is eight feet thick, and the quality of the coal is good.

The hoisting engine is forty-horse power; diameter of drum eight feet, geared, four to one. The breaker engine is also forty-horse power, and the machinery consists of a set of large rolls, one main screen, and pony and pea coal screen, and pony rolls and screens. All the machinery was furnished by Messrs. Wisner and Strong, Pittston, excepting the pump, and is of good workmanship. The pump is on hand but is not set, nor will it be before spring; the one now in use, a No. 6 Knowles, disposes of the water without any trouble.

The sinking of the shaft and building of the breaker was successfully completed without any accident, under the direction of Mr. Bennett. The colliery is delayed in its operation, waiting for the building of an extension of the Heidelberg branch of the Lehigh Valley road to take away its coal. The capacity of the breaker will be about three hundred and fifty tons per day.

HEIDELBERG SHAFT.—This is a new shaft, sunk by the Lehigh Valley Railroad Company, on a large tract of land owned by them, adjoining the Butler colliery, in Pittston township. The shaft is forty-two and a half feet long, by twelve and a half feet wide, and is three hundred and fifty feet in depth, reaching the lowest vein of coal in the Wyoming basin. At the depth of seventy-five feet, the Big vein was struck, fifteen feet in thickness; and at a depth of one hundred and twenty-five feet, the Marcy or Clark vein was penetrated, ten feet in thickness—both of these veins are said to be in fine condition, and the coal of an excellent quality. At the depth of one hundred and seventy-five feet, and two hundred and fifty feet, they cut two small veins, unpromising at the shaft, but proving better at other points, indicating that they may be workable. The shaft is intended for two pairs of carriages to the lower of these two small veins, (two hundred and fifty feet,) thence to the bottom, one pair. There is an upcast apartment extending the whole depth of the shaft having an area of one hundred square feet, and upon this it is purposed to erect a good large fan to provide ventilation for the workings in all the veins. With such an upcast and with a first-class fan, the ventilation of the mines is amply assured. No explosive gas has been developed yet, nor is there very much water, though it is expected that considerable water will be met as the workings extend, and circumstances will determine whether steam or Bull pumps will be used.

The second opening is a slope driven across the measures at an angle of twenty-five degrees, and to be connected through each vein with the shaft. The total length of the slope will be over four hundred feet; it will be used also for a traveling way, and it is of such width, (being fourteen feet,) that if needed at any time, they can, by building a strong partition, cut off a hoisting way in the slope without interfering with its safety as a traveling way.

The plans for hoisting and breaker engines and other necessary machinery are not yet fully completed, but I am assured by Fred. Mercur, Esq., the general superintendent of the Lehigh Valley company, that this new colliery shall not bring discredit on my district., From the reputation of the company and that of Mr. Mercur, I have no fear but the colliery will be first class in all its parts when completed. My present understanding is, that the old Heidelberg breaker will be fitted up with improved machinery, and that the coal will be run on the surface from the shaft to this breaker for preparation for market. The shaft and slope have been sunk without a single accident, which is very gratifying.

Greenwood Shaft.—In my report for 1879 I mentioned that the Pennsylvania Anthracite Coal Company proposed sinking a shaft at the Greenwood colliery, in Lackawanna township. They commenced sinking the shaft in January and suspended work on it in July, 1880, after sinking it one hundred feet deep, leaving thirty-five feet yet to go to strike what is known as the No. 4 vein. The shaft is eleven by twenty-eight feet, and the cause of its abandonment is not known outside of the parties in charge. It is my humble opinion that it was a great mistake to put a shaft down where this is located, for the great body of the coal lays to the dip from the shaft. Two shafts should have been sunk at the lowest practicable point on the property, near the breakers, which would open up the whole property at once and put it in good shape. But it is to be presumed that those in charge have reasons which are satisfactory to them for locating the shaft where it is, and it may not be justifiable to doubt their wisdom. I certainly do not desire to interfere with their affairs in any manner, but I would like to see the company prosper. It is not known when the sinking of the shaft will be resumed.

New Twin Shaft.—This new shaft is located close to the junction of the Lackawanna and Bloomsburg and Lehigh Valley railroads at Pittston, and sunk by the Pittston Coal Company. It has an area of one hundred and forty (140) square feet which is to be divided into two equal sized hoisting ways, and the shaft is two hundred and nineteen (219) feet deep to the bottom of the "Marcy" or "Clark" vein. This will be hereafter the main shaft and the downcast for ventilation. the old shaft being the upcast upon which it is proposed to erect a good sized fan in place of the small one now in use. The old shaft will also be the second opening and is already in communication with the new shaft. The coal at this point is from four and a half to five feet thick and of excellent quality, free from slate and bone. There are one hundred and forty-five acres to be worked, and a large part of the land, judging from adjacent collieries, is underlaid with coal of an average thickness of ten feet. The fourteen feet and seven feet veins have been exhausted through the old shaft. From a point near the foot of the new shaft a slope has been driven two hundred and ten (210) feet through the coal into the bottom of a basin, and at the foot of this slope there is a splendid passing branch one hundred yards long. A fourteen by twenty-four inch engine will be used to hoist the coal up the slope. The present superintendent, George W. Cooper, Esq., does not apprehend any trouble from water or gas, but I am of opinion that considerable gas will be displaced in the working of this vein, and that it will require good ventilation to dilute and dispose of it so as to avert explosions.

On the surface a complete new breaker has been built, with a capacity of four hundred tons per day. The machinery consists of a hoisting engine, 18×36 inch cylinder, a 14×24 inch breaker engine, a No. 8 Guild & Garrison steam pump, set of rolls, a twenty feet main screen, and a ten feet counter screen. For a breaker of its size and capacity, it is fitted up with all the modern conveniences for preparing and cleaning coal.

The work of sinking was commenced, under the superintendence of Charles Hiscock, Esq., March 28, 1880, and the coal was reached on July 12, same year, and I am glad to say, that no accident of any kind occurred during the sinking, which is creditable to the workmen and to the superintendents. The aggregate cost of the sinking of the shaft and the new breaker is estimated at $20,000.

JERMYN'S NO. 4 SHAFT.—John Jermyn, Esq., on the 22d of November, effected a perpetual lease of nine hundred and seventy (970) acres of coal land from Messrs. Pancoast & Price, Philadelphia. The land is located in Dickson borough, and the surface, as well as the coal, is included in the lease. In accordance with the usual enterprise of Mr. Jermyn, he at once entered upon the land, and on the fourth day after the lease was signed, November 26, he commenced sinking, and at this writing, his shaft, which is twenty-six feet long and of the usual width, is down thirty-six feet through the worst kind of quicksand. There is five feet more of quicksand, and about seven feet of gravel to go through to the rock. It is purposed to sink this shaft to the Big vein, which is about three hundred and sixty (360) feet from the surface, that being the coal which will be first worked.

Another shaft, 10×18 feet, will be immediately sunk, one hundred and twenty-five (125) yards away from the main shaft, for a second opening.

As the lease calls for two breakers on the property, coal will be hoisted through both shafts, and the two breakers will be erected, containing all the modern improvements in machinery, to clean the coal and prepare it for market. There will be a pair of 24×48 direct acting engines for hoisting at the main shaft, and one 16×36 breaker engine, with nine boilers thirty-six feet long by thirty-four inches diameter. The boiler-house will be large enough for twelve boilers, in case that number is required. There will also be a pair of 16×30 hoisting engines for the second opening, and an 18×22 fan engine, to run a twenty feet diameter fan. There will be six boilers for generating steam at this shaft also. The pumping will be done in two lifts with four of Guild and Garrison's 14×24 pumps, two pumps in each lift. A building thirty feet wide by ninety feet long is to contain the blacksmith, carpenter, and machine shops, and a 9×12 engine will run the shops.

The above, of course, is only a rough outline of this new enterprise, which, before the close of another year, will be fully developed, and will be in full operation.

STORR'S SHAFT.—The Delaware, Lackawanna and Western Railroad Company having broken ground for a shaft at Dickson borough, which is to be ten by forty feet, and about three hundred feet deep to the Big or "G" vein. The company has a large territory to be developed here, which will require other shafts in the near future. The reason given by B. Hughes, Esq., for the large size of the shaft, is an excellent one, and it is recommended to the consideration of others who contemplates sinking. He says: "The reason of its being so long is, I want more area for our upcast. We find, generally, more friction in the upcast alone than in all the workings of the mine"

This company have also extended the Continental shaft and its air-shaft to the Clark vein, a distance of sixty-three feet below the Big or "G" vein. In sinking, another vein was penetrated, but it is not large enough to be workable at this point, but at other points it is workable. The Clark vein here is eleven feet thick, eight feet being clean coal of an excellent quality, better than any of the veins above it that have been developed at this shaft.

Prosecutions for Violation of Law.

There were but two cases prosecuted for violations of law in my district during the year, and both cases were pending at the close of 1870. As I have always stated, this is the most unpleasant duty that devolves upon an inspector, and one that I would be glad to shirk, if I were not bound by a solemn oath to perform it. These cases were very effecting ones, for one of the parties was an unfortunate old gentleman, who has been fearfully burned by an explosion of gas, though that misfortune overtook him through his own heedlessness, to use the mildest term possible. He held the important position of mining boss in the No. 6 shaft, Jenkins township, under the Pennsylvania Coal Company. The charges entered against him were for neglecting to "provide that all doors used in assisting, or in any way affecting the ventilation of the mine, were so hung and adjusted as that they would close of their own accord, and could not stand open," and for neglecting to provide an attendant at a door. Because of this neglect a certain door was left open, and remained open through the night of October 29, 1879, whereby a large quantity of gas accumulated in a heading that the door was put to turn the air into, which was found by the fire boss on making his rounds the next morning. Considerable excitement was caused at the time by finding of the gas there, and because of the door being left open, and search was made for the person who left the door open, and the guilt(?) was attached to a young man named Timothy Ford, who was laboring in one of the cross-headings. Ford was suspended from work as a punishment for leaving the door open, and he was informed that he would not be allowed to go to work until he got permission from the inspector. November 6, Ford called on me for my permission, saying that he was sent by William Reynolds, the mine boss of No. 6 shaft. After learning his version of the affair, I informed him that I had nothing to do with the matter of permitting or of prohibiting his working, as the inspector had no right to interfere with the hiring or discharging of men. However, under the circumstances, I deemed it to be my duty to visit the colliery and to enter into a thorough investigation of the whole matter, and the following day, November 7, I did so. On examining the door, I found that it was not so hung and adjusted as that it would close of its own accord, and I also found that it was not " provided with an attendant, whose constant duty it is to guard " such doors, " and prevent their being left open."

The investigation disclosed, further, that John McCartney, the fire boss, or assistant mine boss, had neglected to " go over the mine " on the evening of October 29th, after the workmen left the mine or colliery, and see that the doors of the passageways were all properly closed, &c. After due consideration, under a painful knowledge that neglect of this kind was becoming of common occurrence, I very reluctantly caused the arrest of William Reynolds, the mine boss, and John McCartney, the fire boss, which was done December 13, 1879, and both were bound in $500 each to appear at court.

The cases came up for trial in the September term of last year, but owing, no doubt, to the compassion of the jury for Mr. Reynolds' bodily condition, through fearful burns he had suffered, as before stated, they rendered a verdict of not guilty, but the defendant to pay the costs. Being satisfied that Reynolds was unquestionably the most guilty of the two, I then caused a *nol. pros.* to be entered in the case of John McCartney. The suits answered the purpose intended in a great measure, though no conviction was had. They caused the mine bosses and fire bosses to exercise more care in obeying the law, and the result has therefore been satisfactory.

Several mine bosses held that because no accident occurred through the accumulated neglect of these men they should not have been prosecuted, and I am under the impression that this idea had considerable influence in the jury box, but I cannot accept the idea as a safe one to practice. It has been my whole effort to *prevent* accidents by checking the reckless and criminal negligence that, sooner or later, inevitably lead to them. The object in all prosecutions is to warn others, and there is no desire on my part to have any person punished for any other purpose. How heartrending it would have been had these prosecutions, been instituted in consequence of an explosion that might have resulted in the loss of a half dozen or more lives, or even one life. It would have been poor satisfaction, indeed, to prosecute under such circumstances, and I pray that I may never have occasion to do so.

I was very much pleased at the excellent and lucid charge of his Honor. Charles E. Rice, P. J., to the jury in the case, as he construed the law in exact conformity with the views I have always held. This is especially true in relation to the discretion claimed by mine bosses and others. I have always held that where the law provides that certain things shall be done that neither the mine boss nor the inspector nor anyone else has any discretion in the matter, and Judge Rice has very forcibly explained the law in this respect, so that all controversy on the subject hereafter must cease. The charge is such good law that I deem it proper to insert it here for the benefit of all parties concerned.

Quarter Sessions of Luzerne County.

COMMONWEALTH *vs.* REYNOLDS.

1. "A mining boss has no discretion in the performance of the duties imposed on him by sections 8 and 9 of the mine ventilation law.

2. "He cannot say, in answer to an indictment for neglect of duty under section 9, in not providing that a door was so hung as not to stand open, that the door was not necessary.

3. "The duty imposed on a mining boss cannot be delegated by him to another.

4. "But if the company took from his charge a particular portion of the mine and placed it in charge of another, he would not be responsible for neglect of duty in that portion of the mine, although the company might be responsible in case of an accident.

5. "If the door was one affecting the ventilation, it is no answer to say that it was not necessary to the ventilation, or that no gas had accumulated in that part of the mine.

6. "Whether a door is a 'main door' or 'check door' held to be a question of fact, but if found to be a 'main' door the defendant could be convicted for not providing for it a *constant* attendant."

Charge by C. E. Rice, *P. J:*

"The defendant here is indicted for a violation of what is known as the mine ventilation law, passed in 1870, the history of which has been commented on by counsel. As you all know, this important legislation was brought about by a great calamity, and was intended to work a radical change in the method of ventilating coal mines, and to secure safety to the men employed therein.

"By the seventh section of the act it is made the duty of the owners or agents of every coal mine or colliery to provide for every such coal mine or colliery an adequate amount of ventilation and sufficient apparatus to secure it throughout the mines. But in order to secure this ventilation and to insure against accidents, in addition to providing the best apparatus that can be secured, it is made the further duty of the agent or owner of the mine or colliery to employ an inside foreman, or person who is commonly called a mining boss, upon whom are imposed certain peremptory duties by the statute. These duties are to some extent recited in the section of the act which we have just read to you. (Sec. 8, act of March 3, 1870, P. L., 6; P. D., 1069, *pl.* 8.) We say to you, with regard to these duties, because we ought, as a court, to so express ourselves in construing this act of Assembly, that there can be no doubt as to what the duties of the mining boss are, and as to what discretion he has in performing them, that the statute makes these duties peremptory on the mining boss, and there is no discretion vested in him in the performance of them. By this we mean that he cannot say that the necessities of the particular mine or of the particular occasion do not require him to perform things required of him by the statute. This statute is supposed to express the legislative wisdom of the State—to express what was necessary and best to secure the proper ventilation of the mines and the security of the men who work under the ground, and we repeat, as a matter of law, that the mining boss *must* perform the duties imposed on him by the statute, and he has no right to set up his private judgment against that of the Legislature and to say that it is not necessary for him to perform them, or that he has power to perform them in some other way. If he fails to perform them he is guilty of negligence, even though no accident occurs.

"Now, in the next section of the act it is provided that the mining boss shall provide 'that all doors used in assisting or in any way affecting the ventilation of the mine shall be so hung and adjusted that they will close of their own accord, and cannot stand open.' We say to you, gentlemen, that this is a positive duty imposed on the mining boss—one which the statute expressly calls upon him to perform. He need go no further than the words of the act of Assembly. He need only inquire 'What has the statute provided as to my duties in this regard?' The language is, 'He shall provide that all doors used in assisting or in any way affecting the ventilation of the mine shall be so hung and adjusted that they will close of their own accord, and cannot stand open.' As to this duty, we say to you, as we have said with regard to the duties prescribed in the preceding section, that if there is a door which is provided for such a purpose by the owners or operators of a mine, in carrying out his general duties, to which we have referred, the mining boss has no discretion as to what he shall do under this section.

"Again, gentlemen of the jury, it is a duty which is to be *personally* performed. He is to provide. He is to see that it is done. The statute does not necessarily imply that he shall make the door, or that he shall hang the door, but that the person upon whom this responsibility rests shall see that the door is so hung that it will close of its own accord. It is a duty which he cannot delegate to another.

"Again, in this offense, of course, as in all others, the neglect of the duty must be a neglect of duty which the person knows to be unperformed. For example: If he has seen and provided that the door has been properly hung, and through some mishap or other it gets out of order in the *interim* while he is away from this portion of the mine engaged in his duties, and the fact does not come to his knowledge, then he could not be held responsible for a criminal offense if he did not, during that *interim*, see that it was immediately repaired. But as soon as the knowledge does come to him that the door is out of repair, then, gentlemen, it becomes his immediate duty to provide that the door is placed in such a situation 'that it shall,' in the language of the act, 'close of its own accord.'

"Various other duties are imposed upon the mining boss, and upon other persons who are connected with the mine. It is plainly provided, 'that the neglect or refusal of any person or party to perform the duties provided for and required to be performed by sections six, seven, eight, nine, and ten of this act, by the parties therein required to perform them, shall be taken and be deemed a misdemeanor by them, or either of them, &c.' Now, it is under that section that this indictment is brought to your attention. The first inquiry which you will make is: Was the door in question a door affecting the ventilation of the mine? I do not purpose to recite in detail the testimony of the witnesses upon this point. You will remember it as to why this door was placed there. It is alleged, on the part of the Commonwealth, that it was placed there after a report had been made by the fire boss, that gas had accumulated or had been found in this cross-heading, which has been spoken of by the witnesses; that the next morning a door was provided for that place in order to drive the air up into that cross-heading. You will remember the testimony of the other witnesses as to what the purpose of the door was. Now we say to you, as matter of law upon this point, that if the Pennsylvania Coal Company had provided at that point a door for the purpose of sending the air up to this cross-heading and back again, for the purpose of affecting or changing the ventilation of that portion of the mine, then the mining boss, in the performance of his duty, would not be authorized or justified in neglecting the performance of the duty to which we have called your attention, under section ninth of the statute, upon the ground that, in his opinion, it was not necessary to have a door there. In other words, there being a door there, and it affecting the ventilation of the mine, it became then the imperative duty of the mining boss, under the statute, to see that that door was so hung that it would close of its own accord. If this were not so, if these duties, which are imposed upon the mining boss, upon the fire boss, upon the company, and the various employés of the mine, can be considered discretionary in any case on their part, the statute would be a dead letter, because it could not be enforced. We say to you, then, that if this door affected the ventilation, the mining boss would not be justified in saying that no accident had occurred, or that no gas had been found there. The very object of the statute, and the very object of the system of ventilation which was provided by the statute, and which it was intended the law might enforce, was to prevent the accumulation of gas.

"We come now to the main question of fact which is involved in this case, namely: Was the defendent the mining boss of that portion of the mine where this door is said to have been located? This is a question of fact for you. It is alleged, on the part of the Commonwealth, that he was. It is alleged, on the part of the defendant, that he was not; that the charge of that portion of the mine had been delegated by the company to Mr. Joplin, who was the mining boss of No. 2. You will remember the testimony of the witnesses for the Commonwealth and for the defense upon this point. It is apparently conflicting to some extent. It is your duty, however, to reconcile, if you can, the testimony of all the witnesses, so that it shall be consistent with their truthfulness. If you cannot thus reconcile it, you will pass upon the credibility of the witnesses. In judging of the credibility of the witnesses, you can take into consideration the interest which the witness has in the case; any motive which he may have for varying from the truth; any bias for or against the Commonwealth or the defendant; his conduct upon the witness stand; his frankness and his intelligence, and his opportunities of observation or knowledge. There are various methods by which juries can almost invariably arrive at the truthfulness of witnesses who give their testimony under the solemnity of an oath. We can only give you some general hints as to this point, as to whether or not the defendant had the responsible charge of this portion of the mine where the door was. Did he have charge of the working of the men at that point—the employment of the men, the paying of them? Did he have charge of the ventilation? Did he have charge of this door? That is, was he authorized, was it within the scope of his duties, or of his functions, according as his relations were with the company, to give directions in reference to this door? Did he have charge of the employment of those who were understood to have charge of the door? Did he have authority given him from the company to discharge those who should be guilty of negligence with regard to the door? You may take these circumstances into consideration in inquiring whether or not he was the man who, by express authority from the Pennsylvania Coal Company, had charge of that particular portion of the mines in the capacity of mining boss.

"As to another feature of the case, we repeat what we have said in another connection: That if he had these duties to perform, if he was so authorized by the company, he could not delegate them to another, even though the other was the mining boss of another mine of the same company. If, however, you shall find, from all the testimony in the case, that though Mr. Reynolds was the mining boss of shaft No. 6, and that this portion of the mine where this door was, belonged properly to shaft No. 6, but that the company had taken the care and responsibility and management of that portion of the mine from him, then he could not be convicted, though the company might, in case of accident, have been responsible. In other words, if you find that though he was nominally the mining boss of shaft No. 6, though you find that this portion belonged to that particular mine, yet if the care and management of that particular portion of the mine had been taken away from him by the company, then he could not be held responsible in this case.

"The second count in the indictment, charges the defendant with having neglected to comply with this provision of the statute: 'He shall see that all *main doors* shall be provided with an attendant, whose constant duty shall be to guard them, and prevent them being left open.' Whether or not this was a main door or a check door, is almost purely a question of fact, about which there is conflict of testimony. If you conclude that it was a main door, then you will inquire whether or not there was provided for it a person whose *constant* duty it should be to guard it, and prevent it being left open. If you should find that it was a main door, and if you should find, under the instructions we have given you, that the duty of seeing that the door was properly hung and properly taken care of under the mine ventilation act, devolved upon this defendant. And if you find further, that he had not provided a person whose *constant* duty it was to see that it was kept shut, he may be convicted as he stands charged in the second count of the indictment. If, however, this was not a main door, then he cannot be convicted as he stands charged in the second count of the indictment.

"In case you find the defendant guilty, you will have nothing to say about the costs. In case you find him not guilty, you may say whether the defendant, the prosecutor, or the county shall pay the costs, or you may divide the costs between the prosecutor and defendant in such proportions as you deem proper. In this connection, however, it is proper for me to say that the prosecutor is a person acting in an official capacity. He is the mine inspector of the Eastern district, whose duty it is to see that the ventilation law is carried out. If in good faith he has brought this prosecution, and there was probable cause for bringing it here, he is to be commended, and it would be very unjust to impose any portion of the costs upon him, even though the prosecution should fail."

I will only add that Reynolds did assume the charge of that portion of the mine on every visit I ever made there. His fire boss went there to examine the place mornings and evenings. His carpenter, assisted by his fire boss, by his order hung the door there on a morning following the finding of gas in the cross-heading. He claimed to have ordered a driver, John Gannon, to see that the door was kept shut, and he claimed that he allowed Gannon extra pay for attending to the door. He suspended Timothy Ford for the alleged negligence of leaving the door open. He went with me when I entered the place to investigate the trouble, and there claimed that he had charge of the place, and never intimated that any one else had anything to do with it. And even on the trial, all the charge in detail said to have been delegated to Henry Joplin, the mining boss of No. 2 slope, was that he was to give the miners driving the cross-headings the point of the compass in which they were to drive. And yet the jury could not understand that he was the mining boss who had charge of that door!

The question raised as to whether the door was a main or check door was so absurd, that it is strange that intelligent men should raise it. No expert in the whole anthracite coal field would hesitate for a moment to pronounce the door a *main* door. If it was not, then there are no main doors to be found anywhere in our coal mines. As to the importance of this particular door, the fact that William Reynolds, the mining boss, suspended Timothy Ford for the alleged offense of leaving it open, demonstrates very forcibly that Reynolds, at least, thought the door important up to the time the prosecution was instituted against him. I am of the same opinion still, and I am very positive in the opinion that many accidents from explosions of gas occur just through such criminal negligence as this case arose from. I have the satisfaction of having done my duty in the premises, without any but the kindest consideration for the defendant.

Treatment of Injured Persons at the Mines.

There is no doubt but many persons after receiving serious injuries have been pitifully neglected and misused at the mines and in being removed to their homes. This is not done, certainly, intentionally, but through ignorance and inexperience. I therefore submit that every mine official, inside and on the surface, should inform himself as to how a person injured should be treated and handled. And the mine officials, so qualified, should take the entire charge of the sufferer until he is put under the care of a surgeon or physician. They should never leave an injured person in charge of friends or relatives at the mines, for the latter in most cases are too excited to act discreetly, and do more harm than good. There are many cases where, if the right thing was done immediately, serious consequences would be averted. Being so firmly convinced of this, I have deemed it proper to lay down a few simple directions how to proceed in the matter under consideration, and it is proper for me to say that I am advised as to the following rules by W. E. Allen, M. D., Hyde Park, one of our most successful surgeons in the treatment of wounds and fractures received in the mines.

1. There should always be kept in readiness at the most convenient place a stretcher, a quantity of limewater and linseed oil, a number of cotton batts, a quantity of bandages, rolled, ready to be applied, a pound of Monsell's salt or subsulphate of iron, a bottle of brandy, and some surgeon's sponges.

2. In case of hemorrhage from a wound, if the blood flows in a continuous stream, and is dark or not very bright in color, it proceeds from a *vein*, and a ligature made by a knotted handkerchief must be applied tightly *below* the wound or between the wound and the extremity. If, on the other hand, the blood comes by *jerks*, and it is bright red, it proceeds from an *artery*, and the ligature must be applied above, or between the wound and the heart. In either case, after the ligature has been applied, the wound should be filled with the "Monsell's salt," covered with cotton, and bandaged.

3. In case of fracture of leg or arm, the limb should be put as nearly as possible in position and supported by cotton batts.

4. In injuries of the head, the wound should be carefully sponged with cold water, and, if there is much bleeding, the "Monsell's salt" should be applied with cotton. In all these cases the sufferer should be carried *home on the stretcher*, if the distance is not too great, while a messenger has gone for a surgeon.

4. In case of burns from explosions of fire-damp or powder, the linseed

oil and lime water should be applied at once with a sufficient quantity of cotton batting to exclude the air. If the man is weak, suffering from the shock, an ounce of whiskey should be given.

In case of suffocation from " Black damp," the person should be brought to the air immediately and cold water applied by dashing in the face and slapping the chest with a wet towel. If the person be apparently breathless the attempt to restore respiration must be made by pressing with both hands, first on the chest, then on the belly, alternately, thus forcing the air into the lungs. This should be continued until the arrival of the physician, who should be sent for as soon as the accident is discovered. In these cases the persons should not be sent home, but *must be treated on the spot* And in any case of accident where serious results are feared, the sufferer should be taken into a warm room at the mines and a physician should be provided as soon as possible to attend him and to direct his removal to his home. This is especially necessary where the distance is great to the home of the sufferer and the weather unpropitious. If such a building was had at each colliery as is required by the sixth section of the mine law, and if such building was kept in the condition that the law requires. it could be used to receive seriously injured persons at the mines until they had recovered from the shock and until they had become in a proper condition to be removed under the direction of a physician.

By observing these brief and simple rules much suffering may be avoided and in many instances life may be saved.

TABLE NO. I.—*A list of accidents resulting in death in the Eastern District of the Pennsylvania, with remarks on the cause of each accident, as shown by*

DATE.	No. of accidents.	Names of Persons killed.	Age.	Widows.	Orphans.	Names of the Collieries.	Location of the collieries.
Feb. 16	1	David McGovern, .	14	. . .	. . .	Marvine shaft, . . .	Providence, Scranton city
26	2	Michael Casey, . .	34	1	4	Meadow Brook tun.,	Scranton city, ...
Mar. 2	3	Patrick McHale, .	38	1	6	No. 2 slope, ...	Dunmore borough, . . .
16	4	Michael Flynn, . .	54	1	2	Green Ridge shaft, .	Scranton city, ...
17	5	Isaac Davies, . . .	58	1	7	Barnum's shaft, . .	Pittston, ...
27	6	John Mort, ...	40	1	2	Cayuga shaft, ...	Providence, Scranton city
29	7	Edward Watkins, .	15	. . .	. . .	Brisbin shaft, ...	Providence, Scranton city
Apr. 19	8	Thos. McLaughlin,	29	1	2	No. 10 shaft, ...	Hughestown borough, .
23	9	Andrew Singleman,	53	1	5	Tompkins' shaft, . .	Pittston borough, ...
May 4	10	James Howard, . .	50	1	4	Taylor shaft, ...	Lackawanna township, .
8	11	John Sheridan, . .	17	. . .	. . .	Twin shaft, ...	Pittston borough, ...
June 1	12	Peter Jourdan, . .	40	1	4	Pierce colliery, . . .	Archbald borough, . . .
2	13	Patrick Barrett, . .	40	1	2	Cayuga shaft, ...	Providence, Scranton city
7	14	Evan Jermyn, . . .	47	1	3	Von Storch slope, .	Providence, Scranton city
July 11	15	Patrick Flynn, . .	45	. . .	. . .	Leggitt's Creek sh'ft	Providence, Scranton city
13	16	David Powell, . . .	13	. . .	. . .	Pyne shaft, ...	Old Forge township, . . .
Aug. 16	17	Patrick Dougher, .	45	1	4	Elk Hill colliery, . .	Dickson City borough, .
23	18	Michael Reap, . . .	50	1	5	Central shaft, ...	Hyde Park, Scranton city
31	19	David Davies, . . .	20	. . .	. . .	Brisbin shaft, ...	Providence, Scranton city
Sept. 1	20	Charles E. White, .	7½	. .	. . .	Elk Hill colliery, . .	Dickson City borough, .
16	21	Felix Slaven, . . .	45	1	2	Filer colliery, ...	Winton borough, ...
16	21	John Dougherty, .	54	1	. . .	Filer colliery, ...	Winton borough, ...
27	22	Edward Loughery,	22	. . .	. . .	No. 6 shaft, ...	Jenkins township, ...
27	23	Lewis T. Williams,	62	1	. . .	No. 2 Diamond shaft,	Hyde Park, Scranton city
29	24	Patrick H. Kelley,	40	. . .	. . .	Tripp's slope, ...	Hyde Park, Scranton city
Oct. 9	25	John O'Rourke, . .	48	1	2	Grassy Island shaft,	Olyphant borough, . . .

Wyoming Coal Field lying east of and including Jenkins township, Luzerne county, the investigation of the inspector, for the year ending December 31, 1880.

Remarks on the causes of the Accidents.	CAUSES OF THE ACCIDENTS.								No. of accidents.
	Explosions of CH4 gas.	Falling of roof & coal.	Falling down shafts.	Crushed by mine cars.	Explosions of powder and blasts.	Miscellaneous—underground.	On surface.	Total.	
Killed by being crushed between a mine car and close pillar; door boy away from his door,	. .	. .	. .	1	. .	. .		1	1
Killed instantly by a fall of roof, caused by robbing pillars and want of care,	. .	1	. .	. .	. .	. .	. .	1	2
	. .	1	. .	1	. .	. .	.	2	
Killed instantly by a fall of roof "immediately after firing a blast,"	. .	1	. .	. .	. .	. .	. .	1	3
Killed instantly by fall of roof,	. .	1	. .	. .	. .	. .	. .	1	4
Killed by falling from the bucket, a distance of about seventy feet, as he was ascending the shaft,	. .	. .	1	. .	. .	. .	. .	1	5
Killed instantly by a fall of roof "immediately after firing a blast,"	. .	1	. .	. .	.	. .	. .	1	6
Killed by being crushed by mine cars, caused by a mule team running away down a run,	. .	. .	. .	1	. .	. .	. .	1	7
	. .	3	1	1	. .	. .	. .	5	
Killed instantly by a fall of top coal under which he was working out a stub of a blast,	. .	1	. .	. .	. .	. .	. .	1	8
Killed almost instantly by a fall of roof, caused by neglect to re-stand a prop discharged by blast,	. .	1	. .	. .	. .	. .	. .	1	9
	. .	2	. .	. .	. .	. .	. .	2	
Fatally injured by an explosion of a cartridge of powder which he was ramming into a hole with the butt end of a drill; died from his injuries May 21,	. .	. .	. .	. .	1	. .	. .	1	10
Killed instantly by a fall of roof through the neglect of his father with whom he was working,	. .	1	. .	. .	. .	. .	. .	1	11
	. .	1	. .	. .	1	. .	.	2	
Fatally injured by a fall of roof; died on June 7,	. .	1	. .	. .	. .	. .	. .	1	12
Killed by a fall of top coal,	. .	1	. .	. .	. .		. .	1	13
Killed instantly, skull fractured, by a fall of bony coal,	. .	1	. .	. .	. .	. .	.	1	14
	. .	3	. .	. .	.		. .	3	
Burned to death by his clothing, which was saturated with a mixture of inflammable oils, taking fire from his lamp,	. .	. .	. .	. .	. .	1	. .	1	15
Killed instantly by being crushed by a large screen upon which he had fallen,	. .	. .	. .	. .	.	.	1	1	16
	. .	. .	. .	. .	.	1	1	2	
Killed instantly by a fall of bony coal through the neglect of the miner, Peter Munley,	. .	1	. .	.	. .	. .	. .	1	17
Fatally injured by a fall of bony coal "immediately after firing a blast; died the same day,	. .	1	. .	. .	. .	. .	. .	1	18
Killed instantly by a fall of roof,	. .	1	. .	. .	. .	. .	. .	1	19
	. .	3	. .	. .	. .		. .	3	
Fatally injured by being crushed in cog wheels of pony screen in the breaker,	. .	. .	. .	. .	. .	. .	1	1	20
Both of these men were instantly killed by a fall of roof. Slaven was stone blind and should not have been employed in the mines, nor should Dougherty, as he was a helpless cripple,	. .	1	. .	. .	. .	. .	. .	1	21
	. .	1	. .	. .	. .	. .	. .	1	21
Fatally injured by a fall of top coal; died on the 30th,	. .	1	. .	. .	. .	. .	. .	1	22
Killed instantly by a fall of roof, entirely through his own recklessness,	. .	1	. .	. .	.	. .	. .	1	23
Killed instantly by a blast to which he returned too soon,	.	. .	. .	. .	1	. .	. .	1	24
	. .	4	.	. .	1	. .	1	6	
Killed almost instantly by a fall of top coal from under which he was chopping out a prop,	. .	1	. .	. .	. .	. .	. .	1	25

TABLE NO. I.—

DATE.	No. of accidents.	Names of Persons killed.	Age.	Widows.	Orphans.	Names of the Collieries.	Location of the collieries.
Oct. 15	26	John Wisce, ...	49	1	4	No. 10 shaft, ...	Hughestown borough, .
Nov. 5	27	James Compton, .	37	1	. . .	Hyde Park shaft, .	Hyde Park, Scranton city
11	28	D. H. Stevens, . . .	32	1	2	Green Ridge slope, .	Dunmore borough, . . .
22	29	William Mason, . .	15	. .	. . .	Eddy Creek shaft, .	Olyphant borough, . . .
23	30	Patrick Keating, .	38	1	2	Sloan shaft, ...	Lackawanna township, .
25	31	James Merrigan, .	14	. . .	. . .	Eaton colliery, . . .	Archbald borough, . . .
26	32	Anthony Bradley, .	43	1	2	Von Storch slope, .	Providence, Scranton city
29	33	John C. Nealon, . .	56	1	7	Eddy Creek shaft, .	Olyphant borough, . . .
Dec. 13	34	Peter Wilson, . . .	58	1	6	No. 12 shaft, ...	Pleasant Valley borough,
25	35	Patrick Dearing, .	22	. . .	. .	Brennan colliery, . .	Fell township, ...
29	36	Michael Murphy, .	55	1	6	White Oak colliery,	Archibald borough, . . .
Total widows and orphans, ...				25	83		

Continued.

Remarks on the causes of the Accidents.	Explosions of CH4 gas	Falling of roof & coal.	Falling down shafts.	Crushed by mine cars.	Explosions of powder and blasts.	Miscellaneous—underground.	On surface.	Total.	No. of accidents.
	CAUSES OF THE ACCIDENTS.								
Killed instantly by a fall of roof "immediately after firing a blast," returned to the face too soon,	. .	1	. .	. .	.	. .	. .	1	26
		2	.		. .		. .	2	
Fatally injured internally by a fall of roof; died on the 9th,	. .	1	. .	. .	.	. .	. .	1	27
Fatally injured by a fall of roof, immediately after firing a blast; died same day,	. .	1	.	.	. .	.	. .	1	28
Killed by falling under a trip of loaded mine cars at the foot of a run which crushed him to death,	.	. .	. .	1	. .	. .	. .	1	29
Fatally injured by a fall of roof; died on the 30th,	. .	1			.	. .	. .	1	30
Skull fractured by being crushed between big cars and bottom of the chute at the breaker; died on the 27th,	. .	. .	. .	. .	. .	. .	1	1	31
Killed almost instantly by a fall of roof,	. .	1	. .	. .		.	. .	1	32
Killed instantly by a premature explosion of a blast,	.	. .	. .	. .	1	. .	. .	1	33
	.	4	. .	1	1		1	7	
Killed instantly by a fall of roof through his own carelessness,	. .	1	. .	. .	.	. .	. .	1	34
Fatally injured by a fall of roof; died the following day,	. .	1	. .	. .	.	. .	. .	1	35
Killed instantly by being crushed between a mine car and a pillar,	. .	. .		1	. .	. .	. .	1	36
	.	2		1			.	3	
Total fatal accidents,	. .	25	1	4	3	1	3	37	

TABLE NO. II.—*A list of serious, but non-fatal accidents in the Eastern District of county, Pa., with remarks on the cause of each accident, as shown by the*

Date.	No of accidents.	Names of Persons Injured.	Age.	Wife.	Children.	Names of Collieries.	Location of the Collieries.
Jan. 10	1	Joseph Kelley, . . .	. .	. .	. .	Eddy Creek shaft, . .	Olyphant borough, ...
10	2	David Vaughn, . .	45	1	3	Central shaft, ...	Hyde Park, Scranton city, .
12	3	John Messett, ...	17	. .	. .	Green Ridge shaft, .	Scranton city, ...
14	4	John McAndrews, .	14	. .	. .	Greenwood colliery,	Lackawanna township, . . .
14	5	John Daniels, ...	26	. .	. .	Pine Brook shaft, .	Scranton city, ...
15	6	John Merrick, . . .	16	. .	. .	Greenwood colliery,	Lackawanna township, . . .
30	7	John Ruane, ...	40	1	4	Greenwood colliery,	Lackawanna township, . . .
Feb. 7	8	John Brogan, ...	21	. .	. .	Roaring Brook shaft,	Dunmore borough, ...
10	9	Thomas Costello, . .	16	. .	. .	Von Storch slope, . .	Providence, Scranton city, .
12	10	Edward Thomas, . .	14	. .	. .	Erie shaft, ...	Carbondale township, . . .
13	11	Daniel Igo, ...	17	. .	. .	Central shaft, ...	Hyde Park, Scranton city, .
16	12	John L. Harris, . . .	40	1	5	Bellevue slope, . . .	Lackawanna township, . .
16	13	Timothy Derrick, . .	35	1	. .	No. 10 shaft, ...	Hughestown borough, ...
16	14	John Golden, ...	15	. .	. .	Coal Brook colliery,	Carbondale city, ...
17	15	John Graham, ...	15	. .	. .	Tripp's slope, ...	Hyde Park, Scranton city, .
23	16	Michael Bannon, . .	13	. .	. .	Green Ridge shaft, .	Scranton city, ...
Mar. 3	17	David Brown, ...	18	. .	. .	Law's shaft, ...	Pleasant Valley borough, . .
16	18	George Pry, ...	13	. .	. .	Bellevue shaft, . . .	Lackawanna township, . . .
20	19	John Reap, ...	30	1	4	Central shaft, ...	Hyde Park, Scranton city, .
30	20	Patrick Hoban, . . .	14	. .	. .	Eddy Creek shaft, . .	Olyphant borough, ...
April 6	21	Lewis Richards, . .	16	. .	. .	Spring Brook col'y,	Moosie, ...
6	22	James Mullen, . .	40	1	6	Sloan shaft, ...	Lackawanna township, . . .
8	23	John Hennelly, . . .	17	. .	. .	Bellevue slope, . . .	Lackawanna township, . . .
13	24	Dominick Howard, .	16	. .	. .	Eddy Creek shaft, .	Olyphant borough, ...
14	25	Martin Burke, . . .	16	. .	.	White Oak colliery,	Archbald borough, ...
15	26	John Hefferon, . . .	40	1	2	No. 12 shaft, ...	Pleasant Valley borough, . .
19	27	Thomas Linskay, . .	54	1	3	No. 10 shaft, ...	Hughestown borough, ...
20	28	Oliver McDermott, .	18	. .	. .	Meadow Brook shaft,	Scranton city, ...
21	29	James McAndrews,	22	. .	. .	Roaring Brook shaft,	Dunmore borough, ...
May 4	30	Patrick McHugh, . .	35	1	3	Green Ridge slope, .	Dunmore borough, ...
June 2	31	Stephen Gavin, . .	22	. .	. .	No. 3 shaft, ...	Carbondale city, ...
2	32	Michael Welsh, . .	28		. .	Tripp's slope, . .	Hyde Park, Scranton city, .
7	33	Dominick Gillespie,	38	1	5	Leggitt's Creek shaft	Providence, Scranton city, .
7	33	Daniel McCormick, .	14	. .	. .	Leggitt's Creek shaft	Providence, Scranton city, .
14	34	James Jones, . . .	14	. .	. .	Von Storch slope, . .	Providence, Scranton city, .
14	35	John Alexander, . .	17	. .	. .	No. 1 tunnel, ...	Pittston township, ...

the Wyoming Coal Field, lying east of and including Jenkins township, Luzerne investigations of the Inspector, for the year ending December 31, 1880.

Remarks on Extent of Injury and Cause of Accidents.	Explosion of CH4 gas.	Falling of roof and coal.	Falling down shafts.	Crushed by mine cars.	Explosion of powder and blasts.	Miscellaneous.	On surface.	Totals.	No. of accidents.
Foot mashed by being crushed in pinion wheels to the main screen in the breaker,	. .	. .	. .	. .	. .	. .	1	1	1
Arm fractured by falling off a scaffold or wooden horse while mining,	. .	. .	. .	. .	. .	1	.	1	2
Arm badly fractured by falling under a mine car, having lost his light,	. .	. .	. .	1	. .	. .	. .	1	3
Two fingers cut off by falling along side of a mine car, his hand getting under the wheels,	. .	. .	.	1	.	. .	. .	1	4
Arm fractured by falling while running away from a blast,	. .	. .	. .	. .	. .	1	. .	1	5
Severely injured in the loins by being crushed between a mine car and door-frame,	. .	. .	. .	1	. .	. .	. .	1	6
Small bone of his leg fractured above the ankle by a fall of roof,	. .	1	. .	. .	. .	. .	. .	1	7
	. .	1		3	.	2	1	7	
Finger taken off under wheels of a mine car,	. .	. .	. .	1	. .	. .	. .	1	8
Leg fractured above the knee by being crushed by a culm car at foot of plane, outside,	. .	. .	. .	. .	. .	.	1	1	9
Four teeth kicked out by a mule,	. .	. .	. .	. .	. .	1	. .	1	10
Stomach seriously injured by a kick from a mule,	. .		. .	. .	.	1	. .	1	11
Chest and sides severely injured by a fall of roof,	. .	1	.	. .	. .	. .	. .	1	12
Leg and two ribs fractured and back injured by a fall of coal,	. .	1	.	. .	. .	. .	. .	1	13
Leg fractured above the knee and back injured by being crushed by mine cars,	. .	.	. .	1	. .	. .	. .	1	14
Head and shoulders severely injured by being crushed between a mine car and a prop,	. .	. .	. .	1	. .	. .	. .	1	15
Shoulders and body badly injured by being crushed by mine cars under which he fell,	.	. .		1	. .	. .	. .	1	16
		2	. .	4	.	2	1	9	
Seriously injured by being kicked in the abdomen by a mule,	. .	. .	. .	. .	. .	1	. .	1	17
Collar-bone fractured by being crushed by mine car,	. .	. .	. .	1	. .	. .	. .	1	18
Back badly injured by being crushed between the carriage and buntons in the shaft—narrow escape from death,	. .	. .	. .	. .	. .	1	. .	1	19
Leg fractured by big cars under the chutes at the breaker. Had no business around the cars,	. .	. .	. .	.	. .	. .	1	1	20
	. .	.		1	. .	2	1	4	
Arm fractured by being crushed between a mine car and pillar,	. .	. .	. .	1	. .	. .	. .	1	21
Head and arm badly cut and bruised by coal flying from a premature blast,	. .		. .	. .	1	. .	. .	1	22
Leg fractured by a fall of roof,	. .	1	.	. .	. .	. .	. .	1	23
Hand severely crushed between a mine car and a prop—one finger cut off,	. .	. .	. .	1	. .	. .	. .	1	24
Back and side severely injured by being crushed by mine cars, under which he fell,	. .	.	. .	1	. .	. .	. .	1	25
Shoulder, side, and arm cut and bruised by a fall of top coal,	. .	1	. .	. .	. .	. .	. .	1	26
Leg fractured by a fall of top coal. Thomas McLaughlin was killed by the same fall,	. .	1		.	. .	.	. .	1	27
Leg fractured above the knee by being crushed by a mine car, under which he fell,	. .	. .	.	1	. .	. .	. .	1	28
Arm fractured by a fall of roof,	. .	1	. .	. .	. .	. .	. .	1	29
	.	4	. .	4	1		. .	9	
Hip dislocated by a fall of roof,	.	1	. .	. .	. .	. .	. .	1	30
	. .	1	.	. .	. .			1	
Hips and left side severely cut by coal flying from a premature blast,	. .	.	. .	. .	1	. .	. .	1	31
Thigh fractured and otherwise injured by a fall of roof,		1	. .	. .	. .	. .	.	1	32
Leg fractured below the knee by a fall of roof,	. .	1	. .	. .	. .	. .	. .	1	33
Head and face severely cut by the same fall. This boy was a door-tender, and had no business away from his door, nor was it known that he was there until his groans were heard under the fall,	. .	1	. .	. .	. .	.	. .	1	33
Arm fractured by a mule falling on him,	. .	. .	. .	. .	. .	1	. .	1	34
Back seriously injured by being crushed by mine cars, under which he fell,		. .	. .	1	. .	. .	. .	1	35

TABLE NO. II—

Date.	No. of Accident.	Names of Persons Injured.	Age.	Wife.	Children.	Names of Collieries.	Location of the Collieries.
June 15	36	John Quinn,	38	1	.	Greenwood shaft,	Lackawanna township,
15	36	William Feally,	19	.	. .	Greenwood shaft,	Lackawanna township,
29	37	August Becker,	16	. .	. .	Continental shaft,	Hyde Park, Scranton city,
July 1	38	William Probst,	14	. .	. .	Pierce colliery,	Archbald borough,
7	39	John McHale,	23		. .	Coal Brook colliery,	Carbondale city,
10	40	Michael Shea,	50	1	6	Fairlawn slope,	Scranton city,
14	41	William Price,	35	1	4	Dodge shaft,	Lackawanna township,
17	42	William Barth,	38	1	7	Capouse shaft,	Hyde Park, Scranton city,
19	43	William Mahon,	15	. .	. .	Eddy Creek shaft,	Olyphant borough,
20	44	Thomas Gleason,	60	1	. .	Continental shaft,	Hyde Park, Scranton city,
21	45	Thomas Haley,	40	1	1	Meadow Brook shaft,	Scranton city,
22	46	Patrick Berry,	58	. .	. .	Capouse shaft,	Hyde Park, Scranton city,
26	47	Martin Maloney,	45	1	2	Pine Brook shaft,	Scranton city,
26	48	John Becker,	39	1	3	Eddy Creek shaft,	Olyphant borough,
Aug. 2	49	Michael Agen,	50	1	5	Central Shaft,	Hyde Park, Scranton city,
2	50	John Killbride,	46	1	6	Bellevue slope,	Lackawanna township,
4	51	John Master,	52	1	7	Pyne shaft,	Old Forge township,
10	52	Thomas Reap,	50	1	6	Green Ridge slope,	Dunmore borough,
11	53	James Coolican,	24	. .	. .	Forest City colliery,	Forest City,
20	54	James Thomas,	17	. .	. .	Dodge shaft,	Lackawanna township,
24	55	Frederick Noyle,	45	1	1	Brisbin shaft,	Providence, Scranton city,
25	56	Patrick Lynch,	38	1	2	No. 4 shaft, Gipsey [Grove,	Dunmore borough,
31	57	Anthony Flannery,	50	1	7	Archbald shaft,	Lackawanna township,
31	58	Watkin Price,	13	. .	. .	Von Storch slope,	Providence, Scranton city,
Sept. 6	59	Michael Kelly,	15	. .	.	White Oak colliery,	Archbald borough,
7	60	William Dunner,	21	. .	. .	Capouse shaft,	Hyde Park, Scranton city,
10	61	James Fair,	43	1	4	No. 11 shaft,	Jenkins township,
13	62	Henry Miller,	55	1	5	Bellevue slope,	Lackawanna township,
13	63	John Young,	18	. .	.	Green Ridge shaft,	Scranton city,
14	64	David Morgans,	14	. .	. .	Bellevue slope,	Lackawanna township,
14	65	Dominick Kearney,	55	1	6	No. 4 shaft,	Jenkins township,
15	66	Thomas Jenkins,	14	. .		No. 5 shaft,	Jenkins township,
15	67	John Fern,	. .	. .	. .	Archbald shaft,	Lackawanna township,
15	68	John Welsh,	40	1	9	Dodge shaft,	Lackawanna township,
20	69	Patrick Gillan,	16	. .	. .	Von Storch slope,	Providence, Scranton city,
21	70	John Lloyd,	19	. .	. .	Von Storch slope,	Providence, Scranton city,
21	71	George Williams,	16	. .	. .	Cayuga shaft,	Providence, Scranton city,
22	72	John Hopkins,	15	. .	. .	Sloan shaft,	Lackawanna township,
27	73	James Gannon,	16	.	. .	Marvine shaft,	Providence, Scranton city,
28	74	Martin Commons,	48	1	5	White Oak colliery,	Archbald borough,
28	75	Daniel Morgan,	13	. .		Mt. Pleasant slope,	Hyde Park, Scranton city,

Continued.

Remarks on Extent of Injury and Cause of Accidents.	Explosion of CH4 gas.	Falling of roof and coal.	Falling down shafts.	Crushed by mine cars.	Explosion of powder and blasts.	Miscellaneous.	On surface.	Totals.	No. of accident.
Eyes seriously injured by a blast exploding, which was supposed to have blown the tamping,					1			1	36
Hand blown off and the other hand injured by the same blast,					1			1	36
Body severely squeezed between a culm car and the chute at the breaker,							1	1	37
	. .	3		1	3	1	1	9	
Head severely injured by being squeezed between mine cars,				1				1	38
Face and neck severely cut and leg bruised by a fall of roof,		1						1	39
Leg fractured by barring coal down upon himself at the face of his chamber,		1						1	40
Leg fractured and badly cut by a large lump of coal rolling on him,						1		1	41
Body injured by being crushed between big cars at the breaker, on the surface,							1	1	42
Hips, back, and arm injured by being crushed between a mine car and prop,				1				1	43
Collar-bone fractured by being thrown by a lever used in lifting a car on the track, on the surface,							1	1	44
Head severely cut by a fall of roof,		1						1	45
Leg fractured by being crushed between mine cars,				1				1	46
Leg fractured by falling on the track as he was going to his work,						1		1	47
Leg fractured by a fall of coal which he was barring down,		1						1	48
	. .	4	. .	3		2	2	11	
Two ribs fractured and otherwise injured by a fall of roof,		1						1	49
Leg fractured by a fall of roof,		1						1	50
Leg severely cut by a fall of coal from the face which he was working out,		1						1	51
Head severely injured by a fall of roof which he was barring down,		1						1	52
Leg fractured below the knee by a fall of roof,		1						1	53
Head severely injured by the door of a mine car falling on him,						1		1	54
Arm fractured by falling off a wooden "horse" while barring down rock,						1		1	55
Leg fractured by being crushed by mine cars,				1				1	56
Ankle dislocated by a stone rolling against him from the side in the slope,						1		1	57
Arm fractured by falling on a "T" iron rail,						1		1	58
	. .	5		1		4		10	
Leg fractured by being crushed between mine cars,				1				1	59
Body seriously shocked by falling from a scaffold, a distance of twenty-five feet, at breaker,							1	1	60
Arm fractured near the wrist by a fall of roof,		1						1	61
Back and chest injured by being crushed between loaded mine cars, on the surface,							1	1	62
Leg fractured, and otherwise injured by falling from the carriage in the shaft,			1					1	63
Body and limbs severely injured by being crushed by mine cars at the foot of an inside slope,				1				1	64
Leg fractured by a prop rolling on him at the prop pile, on the surface,							1	1	65
Back and chest severely injured by being crushed by a mine car under which he fell,				1				1	66
Leg fractured at the thigh by lumber rolling on him from a car which he was unloading,							1	1	67
Shoulders and hips injured by a premature blast, ignited by a gas blower in the hole,					1			1	68
Hand badly mashed under a car wheel—finger cut off,						1		1	69
Leg fractured at the knee by being crushed by mine cars,				1				1	70
Leg fractured between the thigh and knee by a blast through a pillar,					1			1	71
Hip injured by being crushed by a mine car, his foot being caught between rail and switch,				1				1	72
Hands badly injured by being crushed by mine cars,				1				1	73
Back and ankle injured by a fall of roof,		1						1	74
Arm fractured by falling under a mine car while attempting to pass it in the dark,				1				1	75
	.	2	1	7	2	1	4	17	

TABLE NO. II—

Date.		No. of Accidents.	Names of Persons Injured.	Age.	Wife.	Children.	Names of Collieries.	Location of the Collieries.
Oct.	8	76	John Jones, ...	18	. .	. .	Taylor shaft, ...	Lackawanna township, . . .
	9	77	Martin Keenan, . . .	18	. .	. .	Continental shaft,	Hyde Park, Scranton city, .
	13	78	Harry Keiser, ...	19	. .	. .	Sibley shaft, ...	Old Forge township, ...
	18	79	John McCue, ...	14	.	. .	Dodge shaft, ...	Lackawanna township, . . .
	21	80	Alfred Hill, ...	35	1	2	Pine Brook shaft, . .	Scranton city, ...
	22	81	William Swartz, . .	12	. .	. .	Forest City colliery,	Forest City, ...
	23	82	Thomas Milton, . . .	16	. .	. .	No. 4 shaft, ...	Jenkins township, ...
	26	83	William Leighton, .	16	.	. .	No. 6 shaft, ...	Jenkins township, ...
	26	84	Joseph Burns, ...	18	.	. .	Meadow Brook shaft,	Scranton city, ...
	30	85	Michael Fogerty, . .	37	1	. .	School Fund slope, .	Hyde Park, Scranton city, .
Nov.	2	86	Robert Carty, . . .	35	1	.	Marvine shaft, . . .	Providence, Scranton city, .
	6	87	Robert Thompson, .	14	. .	. .	No. 7 shaft, ...	Jenkins township, ...
	9	88	John Gilligan, ...	50	1	6	Twin shaft, ...	Pittston borough, ...
	11	89	John Davies, ...	71	1	8	Von Storch slope, . .	Providence, Scranton city, .
	13	90	Martin Toolin, . . .	24	.	.	Coalbrook colliery,	Carbondale city, ...
	18	91	William Hobbs, . . .	49	1	5	Mt. Pleasant slope, .	Hyde Park, Scranton city, .
	22	92	William Loughery, .	66	1	5	No. 6 shaft, ...	Jenkins township, ...
Dec.	3	93	John Burke, ...	33	1	3	Mt. Pleasant slope, .	Hyde Park, Scranton city, .
	4	94	John Warts, ...	23	1	1	Phœnix shaft, ...	Pittston township, ...
	4	95	William Dunston, .	36	1	4	Coalbrook colliery, .	Carbondale city, ...
	9	96	James Cooper, . . .	25	1	2	Phœnix shaft, ...	Pittston township, ...
	14	97	William R. Thomas,	37	1	3	Continental shaft, .	Hyde Park, Scranton city, .
	14	98	John Fidian, ...	16	. .	. .	Green Ridge shaft, .	Scranton city, ...
	22	99	Michael McKeever, .	45	1	2	Central shaft, ...	Hyde Park, Scranton city, .
	30	100	Patrick Durkin, . .	28	. .	. .	Green Ridge slope, .	Dunmore borough, ...

Continued.

Remarks on Extent of Injury and Cause of Accident.	Explosion of CH4 gas.	Fall of roof and coal.	Falling down shafts.	Crushed by mine cars.	Explosion of powder and blasts.	Miscellaneous.	On surface.	Totals.	No. of accident.
Arm fractured by his clothes being caught in a set-screw on the screen shafting, while he was oiling the machinery. His clothing were all torn off, and his escape from death is wonderful,							1	1	76
Spine injured by being crushed between a mine car and a prop,				1				1	77
Hand smashed by being crushed between bumpers of mine cars,				1				1	78
Seriously injured by falling between a mine car and head-block,				1				1	79
Hip dislocated and back injured by a fall of roof,		1						1	80
Injured severely by a pick flying, which was struck by a passing car, and entering his body,						1		1	81
Collar-bone fractured, and ankle sprained by falling under a mine car,				1				1	82
Compound fractured leg by falling under a car at the breaker, on the surface,							1	1	83
Ankle dislocated, and back and head injured by falling from back of a mule, on the surface,							1	1	84
Ankle dislocated by a fall of roof,		1						1	85
		2		4	. .	1	3	10	
Face and arms severely burned by an explosion of powder, while tying a cartridge, with lamp on edge of box,					1			1	86
Collar-bone fractured by being crushed between a mine car and a pillar,				1				1	87
Leg fractured and cut, and otherwise injured by returning too soon to a blast,					1			1	88
Collar-bone fractured by being crushed between a mine car and door,				1				1	89
Ankle dislocated and hip injured by fall of roof,		1						1	90
Jaw-bone fractured, and head badly injured by a "fall of roof, immediately after firing blast,"		1						1	91
Hands and face severely burned by an explosion of powder,					1			1	92
	.	2	. .	2	3			7	
Leg fractured below the knee, and face injured by a fall of roof,		1						1	93
Leg fractured below the knee by falling under a mine car,				1				1	94
Jaw-bone fractured and some teeth knocked out by a fall of roof,		1						1	95
Leg fractured near the ankle by a tie used in lifting a car on the track striking him,						1		1	96
Compound fracture of an arm and hand, and face severely injured by an explosion of a blast from which he was withdrawing the charge,					1			1	97
Arm fractured by falling under mine cars while trying to stop a runaway mule,				1				1	98
Two ribs fractured, and otherwise injured by a fall of roof, through his own carelessness,		1						1	99
Hips severely cut by a fall of roof; flesh wounds, but no bones fractured,		1						1	100
		4		2	1	1	. .	8	
Whole numbers from all causes for the year,	. .	30	1	32	10	16	13	102	

TABLE NO. III.—*List of Slight Accidents in the Eastern District of the Wyoming Coal Field, during the year 1880.*

Date.	No. of accidents	Names of Persons Injured.	Names of Collieries.	Location of the Collieries.	Remarks on Extent of Injury and Cause of Accidents.
Jan. 2	1	John Moran,	Erie colliery,	Carbondale township,	Head cut and face injured by being caught by screen in the breaker.
5	2	Patrick Atkinson,	Erie colliery,	Carbondale township,	Arm cut by coal from a blast; was returning to it thinking it had missed.
12	3	Edward Hogan,	Leggitt's Creek shaft,	Providence, Scranton city,	Slightly injured by a fall of roof.
15	4	Thomas Lewis,	Pine Brook shaft,	Scranton city,	Slight flesh wound on the back by a fall of roof.
15	5	Andrew McGuire,	Von Storch slope,	Providence, Scranton city,	Hips slightly bruised by a fall of roof.
16	6	Thomas Harris,	Mt. Pleasant slope,	Hyde Park, Scranton city,	Face slightly cut by coal from a blast, to which he returned too soon.
22	7	Thomas McHale,	White Oak colliery,	Archbald borough,	Face bruised by jumping off cars against a prop; had lost his light.
23	8	Thomas Conroy,	Green Ridge slope,	Dunmore borough,	Body bruised and hand slightly cut; caught between cars and rib.
26	9	John Howard, Sr.,	No. 1 shaft,	Carbondale city,	Foot injured by a slight fall of roof.
27	10	Thomas Tighe,	No. 12 shaft,	Pleasant Valley borough,	Thigh bruised by a fall of roof.
27	10	William Lyons,	No. 12 shaft,	Pleasant Valley borough,	Back and side bruised by the same fall of roof.
29	11	Samuel McLarue,	Twin shaft,	Pittston borough,	Slightly injured by a blast exploding after hanging fire.
31	12	David Carter,	Taylor shaft,	Lackawanna township,	Slightly injured by a fall of coal.
Feb. 6	13	William J. Stephens,	Hampton shaft,	Hyde Park, Scranton city,	Injured by a brake lever flying loose and striking him, on the surface.
17	14	William Bowen,	Hampton shaft,	Hyde Park, Scranton city,	Hands and face slightly burned by an explosion of CH_4 gas.
18	15	Patrick Ore,	Tripp's slope,	Hyde Park, Scranton city,	Body slightly squeezed between cars while unhitching his mule.
Mar. 2	16	Edward Narry,	Von Storch slope,	Providence, Scranton city,	Back slightly cut by a fall of coal.
6	17	James McCue,	Phenix shaft,	Pittston township,	Face and hands slightly burned by an explosion of CH_4 gas.
9	18	John Murphy,	Marvine shaft,	Providence, Scranton city,	Face injured by a kick from a mule.
15	19	Patrick Connell,	Pyne shaft,	Old Forge township,	Injured by a kick from a mule.
18	20	Thomas Clark,	Sibley shaft,	Old Forge township,	Leg slightly injured by being squeezed between mine cars.
20	21	George Minnich,	Continental shaft,	Hyde Park, Scranton city,	Slightly injured by a kick from a mule while shoeing it.
22	22	Michael Laven,	Eddy Creek shaft,	Olyphant borough,	Slightly injured by being squeezed between mine car and pillar.
23	23	John Cooney,	Roaring Brook shaft,	Dunmore borough,	Injured by his mule squeezing him against a pillar.
30	24	Frederick Weber,	Fairlawn slope,	Scranton city,	Face cut by barring down coal upon himself.
April 6	25	John Siddons,	Jermyn's shaft,	Jermyn borough,	Injured by being squeezed between mine cars.
8	26	Timothy Burke,	White Oak colliery,	Archbald borough,	Injured slightly by a kick from a mule.
8	27	Henry Belcher,	Phenix shaft,	Pittston township,	Injured slightly by a fall of roof.
12	28	Charles Sartin,	No. 5 shaft,	Jenkins township,	Injured slightly by a piece of rock sliding against him.
15	29	Patrick Dougherty,	No. 12 shaft,	Pleasant Valley borough,	Face and hand injured by a fall of top coal.
17	30	Thomas Duffy,	White Oak colliery,	Archbald borough,	Slightly injured by a runaway on a self-acting plane.
17	31	William Thomas,	Marvine shaft,	Providence, Scranton city,	Back slightly injured by being kicked by a mule.
20	32	Michael McDonald,	Dodge shaft,	Lackawanna township,	Slightly injured by being squeezed between mine cars.
21	33	John Grady,	No. 1 shaft,	Carbondale city,	Contusion of a knee between mine car and a prop.
26	34	Francis Morgan,	Capouse shaft,	Hyde Park, Scranton city,	Slightly injured by a fall of top coal.
May 11	35	Matthew Mangan,	School Fund slope,	Hyde Park, Scranton city,	Thumb mashed between bumpers of mine cars.
22	36	David A. Williams,	School Fund slope,	Hyde Park, Scranton city,	Side and leg bruised by a fall of top coal.
June 2	37	Richard Murphy,	Brisbin shaft,	Providence, Scranton city,	Head slightly injured by a fall of roof.
8	38	Thomas Holwell,	Marvine shaft,	Providence, Scranton city,	Slightly injured by returning too soon to a blast.
8	39	James J. Buckley,	Capouse shaft,	Hyde Park, Scranton city,	Slightly injured between a mine car and the roof.

June	9	40	Farrell Gannon,	Hampton shaft,	Hyde Park, Scranton city,	Slight cuts and bruises by a fall of roof.
	14	41	John Dougher,	Tripp's slope,	Hyde Park, Scranton city,	Slightly injured by being squeezed between a mine car and pillar.
	22	42	Patrick Fallon,	Sibley shaft,	Old Forge township,	Slightly injured by being squeezed between mine cars.
	23	43	John Blue,	Meadow Brook shaft,	Scranton city,	Head and face bruised by a blast through a pillar.
	30	44	Daniel Denney,	Taylor shaft,	Lackawanna township,	Slightly bruised by a fall of roof.
July	6	45	Evan Jones,	Dodge shaft,	Lackawanna township,	Hips injured by being squeezed between a mine car and rib.
	9	46	Thomas Blewitt,	Meadow Brook shaft,	Scranton city,	Both men were slightly burned in face, arms, and hands by an explosion of CH4 gas. Murray passing over a fire signal.
	9	46	John L. Murray,	Meadow Brook shaft,	Scranton city,	
	16	47	John Cadden,	Filer colliery,	Winton borough,	Knee slightly cut by a slight fall of roof.
	21	48	Evan Jones,	Taylor shaft,	Lackawanna township,	Both men were slightly singed by an explosion of gas, into which Jones entered, thoughtlessly, with a naked light. He was fire-boss.
	21	48	John Harris,	Taylor shaft,	Lackawanna township,	
	21	49	John Simpson,	Von Storch slope,	Providence, Scranton city,	Hips slightly injured; squeezed between a mine car and rib.
Aug.	3	50	Thomas Connors,	No. 11 shaft,	Jenkins township,	Head and shoulder slightly injured by a fall of roof.
	3	51	Anthony Newcomb,	Pine Brook shaft,	Scranton city,	Face cut and shoulder slightly injured between mine car and rib.
	5	52	Evan L. Evans,	Spring Brook colliery,	Lackawanna township.	Back slightly bruised by a fall of roof.
	6	53	Patrick Healey,	No. 1 tunnel,	Pittston township,	Leg injured by a fall of top coal which he was barring down.
	9	54	Edward Hastings,	Dodge shaft,	Lackawanna township,	Ankle injured slightly by a fall of roof.
	16	55	Edward Edmunds,	Erie shaft,	Carbondale township,	Face slightly injured by a kick from a mule.
	16	56	Peter Daley,	Hillside colliery,	Pleasant Valley borough,	Back slightly injured by a fall of roof.
	18	57	Michael Grace,	No. 1 tunnel,	Pittston township,	Body bruised by a fall of coal.
	24	58	Thomas Coursey,	Von Storch slope,	Providence, Scranton city,	Arms, hands, and face slightly burned by an explosion of CH4 gas.
Sept.	6	59	William Tonery,	Marvine shaft,	Providence, Scranton city,	Face cut by being thrown by a mule against the rib while fooling with it.
	9	60	Thomas Craig,	No. 4 shaft,	Jenkins township,	Shoulder slightly injured by a fall of roof.
	10	61	Thomas Mullen,	Cayuga shaft,	Providence, Scranton city,	Back and face injured by a fall of roof immediately after firing a blast.
	13	62	David Davies,	Brisbin shaft,	Providence, Scranton city,	Body bruised and hand burned by explosion of a cartridge while charging a hole. Harris was slightly burned on neck and breast by the same.
	13	62	Henry Harris,	Brisbin shaft,	Providence, Scranton city,	
	16	63	John Mahoney,	Meadow Brook shaft,	Scranton city,	Face cut and body slightly bruised by a fall of top coal.
	20	64	Michael O'Neill,	Von Storch slope,	Providence, Scranton city,	Hand cut with a lump of coal while loading a car.
	30	65	James Stewart,	No. 13 shaft,	Lackawanna township,	Back slightly injured by a fall of roof.
Oct.	8	66	John C. Thomas,	Continental shaft,	Hyde Park, Scranton city,	Head and back slightly injured by a fall of coal.
	19	67	John Loftus,	No. 2 shaft,	Dunmore borough,	Slightly injured by a premature blast. A narrow escape.
	23	68	Thomas Kearney.	No. 4 shaft,	Jenkins township,	Arm jammed between the railing of a car and the roof.
	23	69	Thomas Flemming,	No. 11 shaft,	Jenkins township,	Hand injured by a fall of roof.
	23	70	Patrick Hoban,	No. 2 slope,	Jenkins township,	Leg bruised between a mine car and a prop.
	28	71	Griffith Jones,	Pine Brook shaft,	Scranton city,	Back and foot injured by a fall of roof.
Nov.	4	72	George Stevens,	Twin shaft,	Pittston borough.	Arm and face slightly burned by an explosion of CH4 gas.
	5	73	Henry Thomas,	Hyde Park shaft,	Hyde Park, Scranton city,	Back and foot slightly injured by fall of roof. J. Compton was killed by same.
	5	74	Martin Bell,	No. 12 shaft,	Pleasant Valley borough,	Head slightly cut by a fall of roof. Not reported until the 11th.
	11	75	Phillip Burbank,	Leggitt's Creek shaft,	Providence, Scranton city,	Slightly injured; squeezed between a mine car and pillar.
	15	76	Thomas Watkins,	Capouse shaft,	Hyde Park, Scranton city,	Hip and thigh injured by being squeezed between mine cars.
	16	77	John Hines,	No. 1 tunnel,	Pittston township,	Head and hands slightly burned by an explosion of eight inches of powder.
	18	78	John Murphy,	Marvine shaft,	Providence, Scranton city,	Leg slightly cut by falling in front of a mine car.
	19	79	John J. Morgans,	Sloan shaft,	Lackawanna township,	Head and body injured by a fall of coal which he was barring down.
	20	80	John Gavin,	No. 7 shaft,	Jenkins township,	Hip and side slightly injured by a fall of top coal.
	26	81	John Nealon,	Eddy Creek shaft,	Olyphant borough,	Back and side slightly injured by a fall of roof.
	27	82	Thomas Judge,	Phœnix shaft,	Ransom township,	Knee, hand, and face slightly injured by a fall of top coal.
	27	83	James Armstrong,	Seneca slope,	Pittston borough,	Hip injured by a kick from a mule.
	30	84	William Carson,	Capouse shaft,	Hyde Park, Scranton city,	Leg bruised by runaway on a culm plane at the breaker.
	30	84	Henry Rose,	Capouse shaft,	Hyde Park, Scranton city,	Leg slightly injured by the same runaway.
Dec.	6	85	James Gallagher,	Butler shaft,	Pittston township,	Hand cut by coal falling against him, which he was barring down.
	27	86	Patrick Machan,	Meadow Brook shaft,	Scranton city,	Face and hands burned by explosion of cartridge of powder.

TABLE NO. IV.—*Showing the number of persons killed and injured, causes of accidents, and widows and orphans for seven years, 1874—1880.*

CAUSES OF THE ACCIDENTS.	1874.		1875.		1876.		1877.		1878.		1879.		1880.		Totals.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Explosion of carbureted hydrogen gas,	6	10	3	1	6	21	1	28	...	...	3	9	..	...	19	69
Falls of roof,	26	26	18	20	16	29	24	55	11	24	22	27	18	24	135	205
Falls of coal,	13	8	11	25	4	15	7	9	5	10	8	12	7	6	55	85
Falling down shafts,	1	2	1	2	2	..	...	.	1		3	...	1	1	9	5
Explosion of blasting powder,	..	3	1	10	3	12	.	7	1	2	4	6	..	2	9	42
Premature blasts and blasts hanging fire, &c.,	6	13	10	5	...	..	1	7	1	3	1	18	3	8	22	54
Crushed by mine cars,	13	18	12	15	9	19	1	38	5	27	10	31	4	32	54	180
Miscellaneous causes—under ground,	2	5	2	16	2	19	3	19	4	15	2	18	1	16	16	108
Miscellaneous causes—above ground,	2	4	4	8	2	5	3	11	6	8	6	13	3	13	26	62
Whole numbers,	69	89	62	102	44	120	40	174	34	89	59	134	37	102	345	810
Whole number of widows,		38		36		21		29		19		31		25		199
Whole number of orphans,		112		118		79		134		72		125		83		723

TABLE NO. V.—*Showing the production of coal, the number of persons employed, ratio of coal mined for each person employed, for each person killed, and for each person killed and injured, in the Eastern District, for seven years ending December 31, 1880.*

	1874.	1875.	1876.	1877.	1878.	1879.	1880.	AVERAGES AND TOTALS.
Tons of coal mined per year,	6,357,879	7,956,452	4,862,512	4,808,208	4,943,410	7,182,084	6.293,457	42,404.002
Number of persons employed,	16,561	17,808	17,152	16,312	15,699	16,100	17,131	16,680
Tons of coal mined per person employed,	383.9	446.8	283.5	294.8	316.8	446.12	367.4	363.16
Tons of coal mined per life lost,	92,143	128,340	110,511	120,205	145,396	121,730	170,093	122,910
Tons of coal mined per person killed and injured,	40,242	48,515	30,458	22,463	40,190	37,213	45,276	36,713
Ratio of persons employed per life lost,	240.00	287.22	389.81	407.80	461.70	273.00	463.00	338.4

ABLE NO. VI.—*Showing the number of persons killed, and number of persons seriously and slightly injured, and number of days worked; with number of persons employed, and number of kegs of powder used, together with number of tons mined per employé, per life lost, and total tonnage for each colliery for the year 1880.*

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY.

Names of the Collieries.	Persons killed.	Persons seriously injured.	Persons slightly injured.	Days worked by breaker.	Number of persons employed.	Tons of coal mined per employee.	Tons of coal mined per life lost.	Kegs of powder used.	Tons of coal mined during 1880.
Pyne shaft,	1	1	1	170.80	373	397.40	148,222	3,294	148,222
Taylor shaft and drift,	1	1	4	170	379	308 30	116,845	2,596	116,845
Archbald shaft,									
Sloan shaft,	1	2	1	180.30	293	369	108,094	2,402	108,094
Dodge shaft,	....	4	3	173	333	323.80	No death,	2,396	107,836
Scranton Coal Company's slope,									
Bellevue slope,	....	5	....	175.50	273	243.20	No death,	1,475	66,412
Bellevue shaft,	....	1	...	175.50	123	551.20	No death,	1,506	67,797
Hampton shaft,	....	...	3	181.10	382	358.70	No death,	3,045	137,043
Continental shaft,	....	4	2	137	72	..	No death,	1,727	77,743
Hyde Park shaft,	1	....	2	152.30	324	262.20	84,952	1,885	84,952
Central shaft,	1	5	....	179	354	365.70	129,487	2,877	129,487
Oxford shaft,									
Diamond shaft,	1	....	....	179	418	326.50	136,593	3,035	136,593
Diamond No 2 slope,	....	....	....	179	184	317.30	No death,	1,297	58,4 5
Tripp's slope,	1	2	2	179	179	310	55,531	1,234	55,534
Brisbin shaft,	2	1	3	174	293	388.50	56,917.50	2,530	113,835
Cayuga shaft,	2	1	1	177.30	280	342.50	47,959	2,131	95,918
Total, Delaware, Lackawanna and Western Railroad Company,	11	29	22	......	4,260	353.20	136,792.40	33,433	1,504,716

PENNSYLVANIA COAL COMPANY.

Names of the Collieries.	Persons killed.	Persons seriously injured.	Persons slightly injured.	Days worked by breaker.	Number of persons employed.	Tons of coal mined per employee.	Tons of coal mined per life lost.	Kegs of powder used.	Tons of coal mined during 1880.
No. 1 shaft,	....	....	....	217	66	379.50	No death,	715	25,026
No. 4 shaft,	...	2	2	217	156	528.20	No death,	2,354	82,396
No. 5 shaft,	....	1	1	216	164	362.20	No death,	1,703	59,613
No. 6 shaft,	1	2	...	216	170	308.50	52,439	1,498	52,439
No. 7 shaft,	....	1	1	215	156	517.50	No death,	2,307	80,747
No. 8 shaft,	....	....	....	217	147	349.20	No death,	1,467	51,335
No. 9 shaft,	....	..	....	219	142	395.20	No death,	1,603	56,119
No. 10 shaft, seven feet vein,	2	2	....	219	157	322.70	25,332.50	1,448	50,665

TABLE VI—*Continued.*

PENNSYLVANIA COAL COMPANY—*Continued.*

NAMES OF COLLIERIES.	Persons killed.	Persons seriously injured.	Persons slightly injured.	Days worked by breaker.	Number of persons employed.	Tons of coal mined per employee.	Tons of coal mined per life lost.	Kegs of powder used.	Tons of coal mined during 1880.
No. 10 shaft—14 feet vein,	....	....	....	219	44	598.0	No death,	752	26,310
No. 10 shaft—Marcy vein,	....	....	....	219	149	290.0	No death,	1,235	43,213
No. 11 shaft,	....	1	2	216	104	351.5	No death,	1,044	36,560
No. 12 shaft,	1	1	4	217	156	403.4	62,928	1,798	62,928
No. 13 shaft,	....	....	1	216	55	379.5	No death,	594	20,776
No. 2 slope, (Port Griffith,)	....	...	1	215	97	441.0	No death,	1,221	42,774
No. 4 slope,	....	...	1	218	144	434.3	No death,	1,787	62,539
No. 6 slope,	....	....	....	217	63	364.6	No death,	656	22,970
Stark's shaft,	....	....	....	217	200	335.4	No death,	1,916	67,073
Law's shaft,	....	1	....	217	152	339.7	No death,	1,475	51,644
Barnum's, No. 1 shaft,	1	....	....	154	78	368.3	28,729	958	28,729
Barnum's, No. 2 shaft,	....	....	....	......	15	......	....	53	1,587
No. 1 tunnel,	....	1	3	217	101	382.3	No death,	1,103	38,619
No. 2 shaft, (Dunmore,)	1	....	1	200	118	317.0	37,413	1,336	37,413
Gipsey Grove, No. 3 shaft,	....	...	....	196.50	273	326.7	No death,	3,186	89,195
Gipsey Grove, No. 4 shaft,	...	1	....	196.50					
Total Pennsylvania Coal Company,	6	13	17	......	2,907	375.2	181,773.06	32,209	1,090,640

DELAWARE AND HUDSON CANAL COMPANY.

NAMES OF COLLIERIES.	Persons killed.	Persons seriously injured.	Persons slightly injured.	Days worked by breaker.	Number of persons employed.	Tons of coal mined per employee.	Tons of coal mined per life lost.	Kegs of powder used.	Tons of coal mined during 1880.
Von Storch slope,	2	6	5	188	531	363.6	97,090	4,315	194,179.19
Leggitt's Creek shaft,	1	2	2	185.25	346	408.6	141,389.17	3,142	141,389.17
Marvine shaft,	1	2	5	190.25	340	449.8	152,954.04	3,399	152,954.04
Eddy Creek shaft,	2	5	2	186.75	331	312.3	51,687.50	2,296	103.375.08
Grassy Island shaft,	1	...	...	189.75	353	356.3	125,795.19	2,795	125,795.19
White Oak colliery,	1	3	3	187	310	382.5	118,571.11	2,635	118,571.11
No. 1 shaft and White Bridge tunnel,	....	...	2	186	326	303	No death,	684	21,203.02
No. 3 shaft,	....	1	....	188.75	143		No death,	209	6,488.08
Coal Brook colliery,	....	4	....	188.75	494	345.2	No death,	5,500	170,500.19
Rackett Brook breaker,	....	....	...	179	65	... .	No death,	4,325	134,098.13
Total Delaware and Hudson Canal Company,	8	23	19	......	3,242	360	146,069.60	29.300	1,168 557.08

MISCELLANEOUS COMPANIES.

Everhart colliery,	....	....	..	199.75	138	311.8	No death,	1,249	43,028.14
Tompkins' shaft,	1	....	...	187	75	280	21,050.11	731	21,050.11
Seneca slope,	....	....	1	202	205	307.8	No death,	2,397	63,103.13
Ravine shaft, (Idle all the year.)									
Twin shaft,	1	1	2	124	122	109.5	13,361.15	1,101	13,361.15
Beaver colliery,	....	....	...	267	31	486.5	No death,	420	15,082
Butler shaft,	....	....	1	175	198	258.2	No death,	1,955	51,232
Morris & Co.'s colliery,	....	....	...	.. ..	12	....	..	100	
Phœnix shaft,	....	2	3	201	171	280	No death,	1,700	47,930
Columbia colliery,	....	....	....	123.75	49	305.7	No death,	433	14,981
Hillside colliery,	....	...	1	224.75	247	378.2	No death,	2,729	93,432
Spring Brook colliery,	....	1	1	206.50	283	337.3	No death,	2,542	95,480
Greenwood colliery,	....	5	...	190	411	317.4	No death,	6,390	130,441
Sibley shaft,	....	1	2	170	242	321	No death,	3,661	77,691
Meadow Brook colliery,	1	3	5	178.37	271	347.6	94,206	3,690	94,206
National colliery,	....	....	...	177.50	259	353.6	No death,	3,580	91,586
School Fund Association slope,	....	1	2	193	190	339.5	No death,	2,030	64,517
Mt. Pleasant slope,	....	3	1	190	255	384.3	No death,	2,700	98,000
Capouse shaft,	....	3	5	168	511	344.2	No death,	6,390	175,855
Pine Brook shaft,	....	3	3	195.50	182	756	No death,	4,180	137,596
Fairlawn slope,	...	1	1	201	154	259.9	No death,	1,522	40,029
Jermyn's Green Ridge shaft,	1	4	...	170	318	393.3	125,068	4,259	125,068
Green Ridge slope,	1	3	1	198	304	340.3	103,465	3,695	103,465
Roaring Brook colliery,	...	2	1	191	272	338.2	No death,	3,680	91,992
Elk Hill colliery,	2	....	....	141	134	298.4	19,993	1,500	39,986
Filer's colliery,	2	...	1	185	392	283.3	55,530	3,667	111,061
Pierce's colliery,	1	1	....	155.50	298	253.9	75,666	2,806	75,666
Eaton colliery,	1	....	....	194	248	244.6	60,665	2,170	60,665
Jermyn's slope,	....	....	..	198	103	394.1	No death,	925	40,600
Jermyn's shaft,	...	....	1	198	243	378.4	No death,	2,775	91,956
Erie shaft,	....	1	3	166	255	248.6	No death,	2,301	63,403
Brennan's colliery,	1	....	....	237	56	471.1	26,380	804	26,380
Clark colliery,	....	....	....	240	48	256.8	No death,	480	12,325
Forest City colliery,	....	2	..	220.25	47	397.3	No death,	525	18,674
Total miscellaneous companies,	12	37	35	......	6,722	367.4	185,821.40	79,086	2,229,856.08

RECAPITULATION

Delaware, Lackawanna and Western Railroad Company,	11	29	22	......	4,260	353.2	136,792.40	33,433	1,504,716
Pennsylvania Coal Company,	6	13	17	......	2,907	375.2	181,773.60	32,209	1,090,640
Delaware and Hudson Canal Company,	8	23	19	......	3,242	360	146,069.60	29,300	1,168,557.08
Miscellaneous companies,	12	37	35	......	6,722	331.7	185,821.40	79,086	2,229,856.08
Home consumption—estimated at five per centum,	....	....	....	......	......	......	......	.....	299,688
Grand totals,	37	102	93	......	17,131	367.4	170,093.40	174,028	6,293,457.16

TABLE NO. VII.—*The number of men and boys employed at each colliery during the year 1880.*

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY.

NAMES OF THE COLLIERIES.	NUMBER OF PERSONS EMPLOYED INSIDE.							NUMBER OF PERSONS EMPLOYED OUTSIDE.							Grand totals inside and outside.
	Bosses.	Miners.	Laborers.	All company men.	Drivers & runners.	Door boys.	Totals inside.	Bosses.	Mechanics.	Head & plate men.	All company men.	Drivers & runners.	Slate pickers.	Totals outside.	
Pyne shaft,	1	90	83	14	41	7	236	1	8	7	41	7	73	137	373
Taylor shaft and drift,	1	99	86	29	34	14	254	1	11	10	24	7	72	125	379
Archbald shaft,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sloan shaft,	1	79	65	18	30	6	199	1	7	6	20	5	55	91	293
Dodge shaft,	1	76	76	19	25	6	203	1	8	14	24	11	72	130	333
Scranton Coal Company's slope,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bellevue slope,	1	46	42	15	13	2	119	2	12	13	19	10	93	154	273
Bellevue shaft,	1	49	46	10	14	3	123	...	...	...	...	...	...	...	123
Hampton shaft,	1	99	83	25	34	8	241	1	10	14	26	7	80	138	382
Continental shaft,	1	30	...	16	5	...	52	1	7	...	12	...	...	20	72
Hyde Park shaft,	1	75	76	19	26	8	205	1	5	6	33	6	68	119	324
Central shaft,	1	90	90	22	29	9	241	1	7	7	31	5	62	113	354
Oxford shaft,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Diamond shaft,	2	94	94	28	52	7	277	2	10	17	14	16	82	141	418
Diamond, No. 2 slope,	1	44	41	16	19	9	130	1	6	5	8	3	31	54	184
Tripp's slope,	1	39	39	20	24	4	127	1	5	5	6	4	31	52	179
Brisbin shaft,	1	84	70	17	28	9	209	1	7	10	19	4	43	84	293
Cayuga shaft,	1	69	64	26	29	4	193	1	7	7	20	4	48	87	280
Totals, Dela., Lackawanna & Western Railroad Co.,	16	1,045	958	294	403	96	2,812	16	110	121	297	89	815	1,418	4,260

PENNSYLVANIA COAL COMPANY.

NAMES OF THE COLLIERIES.	Bosses.	Miners.	Laborers.	All company men.	Drivers & runners.	Door boys.	Totals inside.	Bosses.	Mechanics.	Head & plate men.	All company men.	Drivers & runners.	Slate pickers.	Totals outside.	Grand totals inside and outside.
No. 1 shaft,	...	20	20	2	4	1	47	...	1	1	5	...	12	19	66
No. 4 shaft,	1	54	52	7	19	4	137	1	4	7	6	...	1	19	156
No. 5 shaft,	1	40	40	9	14	6	110	1	4	6	7	4	32	54	164
No. 6 shaft,	1	38	33	16	19	7	119	...	4	6	8	2	31	51	170
No. 7 shaft,	1	46	46	15	18	4	130	1	4	8	9	...	4	26	156
No. 8 shaft,	1	40	40	9	9	2	101	1	3	7	8	2	25	46	147
No. 9 shaft,	1	35	35	9	12	3	95	1	2	7	6	7	24	47	142
No. 10 shaft, seven feet vein,	1	40	41	9	16	7	114	...	3	5	8	5	22	43	157

No. 10 shaft, fourteen feet vein,	....	12	12	2	3	....	29	....	2	2	2	3	6	15	44
No. 10 shaft, Marcy vein,	1	41	40	7	12	6	107	1	3	6	7	5	20	42	149
No. 11 shaft,	....	26	28	6	10	3	71	..	2	1	6	3	21	33	104
No. 12 shaft,	1	40	40	7	13	3	104	..	3	6	11	1	31	52	156
No. 13 shaft,	1	16	14	6	4	1	42	1	4	1	4	3	...	13	55
No. 2 slope, (Port Griffith,)	1	28	28	10	11	1	79	1	5	5	5	1	1	18	97
No. 4 slope,	1	44	41	9	17	4	119	1	5	6	7	5	1	25	141
No. 6 slope,	...	18	18	3	7	....	46	..	1	....	3	1	12	17	63
Stark's shaft,	1	51	46	12	15	6	131	1	6	5	16	4	37	69	200
Law's shaft,	1	34	38	12	13	5	103	....	5	2	9	3	30	49	152
Barnum's No. 1 shaft,	1	36	18	6	4	....	65	1	3	3	5	...	1	13	78
Barnum's No. 2 shaft,	....	6	4	..	...	...	10	....	2	2	1	...	....	5	15
No. 1 tunnel,	1	35	33	6	6	3	84	1	3	5	6	1	1	17	101
No. 2 shaft, (Dunmore,)	1	33	40	14	9	7	104	1	1	5	7	...	....	14	118
Gipsey Grove, No. 3 shaft, Gipsey Grove, No. 4 shaft,	1	77	76	13	24	11	202	1	2	11	18	6	43	71	273
Totals, Pennsylvania Coal Company,	18	810	789	189	259	84	2,149	14	72	107	164	56	345	758	2,907

DELAWARE AND HUDSON CANAL COMPANY.

Von Storch slope,	1	128	103	59	81	23	395	1	8	15	47	6	62	139	534
Leggitt's Creek shaft,	1	97	49	27	50	20	244	1	8	4	35	4	50	102	346
Marvine shaft,	1	96	52	21	53	18	241	1	9	12	24	4	49	99	340
Eddy's Creek shaft,	1	112	50	20	30	8	221	1	8	11	26	8	56	110	331
Grassy Island shaft,	1	114	53	21	39	14	242	1	7	10	26	7	60	111	353
White Oak colliery,	1	102	60	12	38	10	223	1	6	5	13	9	53	87	310
No. 1 shaft and White Bridge Tunnel,	2	134	81	14	35	11	277	1	12	8	21	2	5	49	326
No. 3 shaft,	1	60	12	12	24	7	116	1	5	7	12	...	2	27	143
Coal Brook colliery,	1	185	68	20	50	22	346	1	9	8	45	10	75	148	494
Rackett Brook breaker,	....	..	....	...	....	....	...	1	1	5	13	7	38	65	65
Totals, Delaware and Hudson Canal Company,	10	1,028	528	206	400	133	2,305	10	73	85	262	57	450	937	3,242

MISCELLANEOUS COMPANIES.

Everhart colliery,	1	30	30	5	11	....	77	1	4	7	3	9	37	61	138
Tompkin's shaft,	1	16	15	3	8	1	44	2	4	3	4	2	16	31	75
Seneca slope,	2	39	39	12	31	6	129	2	3	6	18	4	43	76	205
Ravine shaft, (Idle all the year,)	...	....	..	...	....	....	....	...	...	...	..	...	..	....	....
Twin shaft,	2	26	13	14	3	4	62	1	2	4	12	3	38	60	122
Beaver colliery,	1	8	8	3	4	1	25	1	2	....	1	...	2	6	31
Butler shaft,	2	44	44	6	22	3	121	2	8	7	8	2	50	77	198
Morris & Co.'s colliery,	1	....	....	5	...	....	6	1	2	...	3	...	....	6	12
Phœnix shaft,	2	40	30	13	15	4	104	2	6	5	7	2	45	67	171
Columbia colliery,	1	11	11	1	4	1	29	1	3	2	3	1	10	20	49
Hillside colliery,	2	40	40	45	25	15	167	1	8	10	31	5	25	80	247

TABLE NO. VII.—*Continued.*

NAMES OF THE COLLIERY.	NUMBER OF PERSONS EMPLOYED INSIDE.							NUMBER OF PERSONS EMPLOYED OUTSIDE.							Grand totals inside and outside.
	Bosses.	Miners.	Laborers.	All company men.	Drivers & runners.	Door boys.	Totals inside.	Bosses.	Mechanics.	Head and plate men.	All company men.	Drivers & runners.	Slate pickers.	Totals outside.	
Spring Brook colliery,	2	60	60	20	36	10	188	1	10	6	30	8	40	95	283
Greenwood colliery,	1	103	90	23	54	19	290	1	8	8	29	10	65	121	411
Sibley shaft,	1	75	27	11	26	6	146	1	6	7	20	2	60	96	242
Meadow Brook colliery,	1	85	40	13	22	10	171	1	13	5	10	10	61	100	271
National colliery,	2	70	37	14	29	12	164	1	5	5	12	7	65	95	259
School Fund Association slope,	2	34	34	10	14	6	100	1	3	7	19	....	60	90	190
Mount Pleasant slope,	1	54	54	10	25	9	153	1	5	8	13	5	70	102	255
Capouse shaft,	1	125	119	41	39	24	349	1	16	9	31	3	102	162	511
Pine Brook shaft,	1	54	38	12	18	15	138	1	5	5	12	1	20	44	182
Fairlawn slope,	1	25	28	11	10	4	79	1	5	5	12	7	45	75	154
Jermyn's Green Ridge shaft,	1	80	80	14	35	12	222	1	2	9	22	4	58	96	318
Green Ridge slope,	1	60	55	13	43	11	183	1	5	6	40	4	65	121	304
Roaring Brook colliery,	1	48	53	21	47	15	185	1	15	9	9	11	39	87	272
Elk Hill colliery,	2	43	35	2	10	6	98	1	6	4	2	3	20	36	134
Filer's colliery,	1	150	50	20	52	10	283	2	4	18	32	6	47	109	392
Pierce's colliery,	2	92	52	10	20	5	181	2	6	5	26	8	70	117	298
Eaton's colliery,	1	100	19	10	26	4	160	1	5	6	18	3	55	88	248
Jermyn's slope,	1	23	23	6	10	3	66	1	3	4	6	3	20	37	103
Jermyn's shaft,	1	110	....	14	24	8	157	1	5	7	30	4	39	86	243
Erie shaft,	2	56	65	18	30	14	185	1	6	8	20	2	33	70	255
Brennan's colliery,	1	14	14	....	5	2	36	1	1	4	....	2	12	20	56
Forest City colliery,	1	12	12	3	6	1	35	....	2	1	4	1	4	12	47
Clark colliery,	1	14	15	2	5	....	37	1	1	3	1	2	3	11	48
Totals, miscellaneous companies,	44	1,741	1,230	405	706	244	4,370	38	179	193	488	137	1,319	2,352	6,722

RECAPITULATION.

Delaware, Lackawanna and Western Railroad Company,	16	1,045	958	294	403	96	2,812	16	110	121	297	89	815	1,448	4,260
Pennsylvania Coal Company,	18	810	789	189	259	81	2,149	14	72	107	164	56	345	758	2,907
Delaware and Hudson Canal Company,	10	1,028	528	206	400	133	2,305	10	73	85	262	57	450	937	3,242
Miscellaneous companies,	44	1,741	1,230	405	706	244	4,370	38	179	193	448	137	1,319	2,352	6,722
Grand totals of employees,	88	4,621	3,505	1,094	1,738	557	11,636	78	434	506	1,171	339	2,929	5,495	17,131

LUZERNE AND CARBON COUNTIES,

SOUTH DISTRICT.

To His Excellency HENRY M. HOYT,
Governor of the Commonwealth of Pennsylvania:

SIR: I have the honor to present herewith my sixth annual report of the inspection of coal mines, for the year ending December 31, 1880.

The number of fatal colliery accidents were twenty-six, and non-fatal ninety-three, an increase of one in the former, and a decrease of seven in the latter, over the previous year. Of the twenty-six deaths, ten were instantly killed, and sixteen subsequently died of their injuries. Many of whom, at the time, were not considered to be of a serious nature, especially two driver boys, who were slightly cut on the legs by mine cars, died in about two weeks afterwards, from lock-jaw.

The coal production of the district was 4,298,764 tons, including that used at the mines and sold to the employés, which amounts to eight per cent. of the coal shipped, compared with 4,156,486 tons the preceding year, showing an increase of 142,278 tons. The death ratio of coal mined for each life lost was 165,337 tons, against 166,260 tons in 1879.

While the number of tons of coal mined for each life lost last year is not as great as that of 1879, yet it is quite favorable, to say the least, as it is the true means of comparison.

The condition of the district, as regards ventilation, will be found elsewhere in the descriptive portion of the report.

Accompanying this report will also be found a map and cross-sections of a colliery, operated by A. Pardee & Co., showing the plan of working and the method of ventilation.

Very respectfully submitted,
T. D. JONES,
Inspector of Mines.

HAZLETON, *February, 1881.*

Colliery Improvements.

Under this head will be found a brief description of the collieries where improvements and changes worthy of note have been made during the year just ended. Collieries that are not reported, under the head of improvements, in this report will be considered as not having anything new to note, or else they were reported in preceding reports, hence I think it unnecessary to make a repetition.

The improvements about the mines are steadily progressing, as will be noticed by reading the detailed account of each colliery, given under the above head. The district, during the past year, has been increased by five additional collieries, making, in all, fifty-four, composed of about one hundred mines, including slopes, shafts, tunnels, and drifts, all of which are surface openings.

Three new breakers have been built, and two more are likely to be erected during the ensuing year. Six ventilating fans were put up in the district this year, and several others are in course of construction, an amelioration much needed.

The shipments of coal for the past year were 3,980,337 tons, an increase of 131,739 tons over the previous year, or that of 1879; and an increase of 663,302 tons more than the average coal tonnage marketed during the past six years.

The whole tonnage of coal marketed from the Lehigh region, as per returns from the operators' books, for the six years ending December 31, 1880, was 19,902,209 tons, making a yearly average of 3,317,035 tons, equivalent to about half the capacity of the district when in full operation.

Ventilation of Coal Mines.

While the ventilation at some mines is not perfect, yet it has been greatly improved at many of them during the past year by the erection of ventilating fans, (an account of which can be seen in table No. 8 in this report,) and the enlarging of old air-ways, driving of new ones, &c. However, to take the conditions of the mines, on the whole they are satisfactorily ventilated with very few exceptions. There may be some persons working, in local places, in every mine making an opening towards getting air one way or another that are suffering for the time being, but eventually will be well aired. I refer to those driving cross-cuts, &c. The only serious reasons for complaints is the vitiating agency, (bad lamp oil,) *vide* article in this report headed "Miner's Lamp Oil."

Miner's Lamp Oil.

During the past year the question of miner's lamp oil has become of no small importance, owing to the introduction into our mines of an inferior and injurious quality of oil, the so-called "New Era" coal oil, "Electric Miner's Oil," Wildfire Jack, and many other such names given to oils that it has become my imperative duty to exact on it being disused.

There is no good reason why that underground workmen should not be supplied with the best oil in the market so long as they pay for the same, such as whale oil, lard oil, and cotton seed oil, which invariably gives satisfaction, and there is no reasonable argument why their use should be discontinued or superseded by trashy stuff which is enough to destroy in course of time the health of all the men in the best ventilated mines. There is as much trouble in fighting this nuisance with many of the men as there is with the companies.

The regulations governing the oil questions differ at every other colliery; at some the men are allowed about five cents per day for oil and lamp wick, whilst at others it is furnished by the company, and the allowance kept off. In the first case the men endeavor to economize by using the vitiating stuff; for instance they will buy a gallon of coal oil, costing them from fifteen to twenty cents, while the whale oil will cost about eighty cents per gallon, thereby saving sixty cents by the operation, as it is stated that a gallon of coal oil will last as long as a gallon of whale oil, which appears very good, so far as it goes; but they pay dear for it in the long run when their constitution begins to break down through the contaminating influence of this bad oil and the noxious gases given off in consequence of the various causes underground.

Some persons have been burned by the lamp exploding on their head, but, luckily, not doing much damage. It is well understood there are, in all mines, at times, a few persons who are working in places where the air is perhaps weak, making connection for the air current, driving cross-cuts, &c. They are the persons that have to suffer the most by using this bad oil through the indifference of others. The men that are working in the main air current along the gangway, it is true, are but slightly inconvenienced (except a " bad headache ") by burning it, but as they are few in number, compared with the whole, it is but right that they should desist from the bad practice of using it. In a word, it is almost useless to insist upon the erection of ventilating appliances, at great expense in some cases, if we are going to allow this nuisance to be continued, for I do say that the sanitary condition of the mines is nearly as good without them, when not using the bad oil, as it is with them, when using the contemned stuff. In regard to this complaint, the following notice was published in the " *Hazleton Sentinel*," which is the substance of the whole matter. And since its publication I am told that many of the operators have requested their employés not to use the oil complained of, and that these firms have greatly improved the quality of their oil:

Notice is hereby given to operators, mine superintendents, mine bosses, miners, laborers, drivers, and all persons employed in the mines in the South district of Luzerne and Carbon counties, better known as the Lehigh region, that I protest against the using in the mines of any inferior quality of miners' lamp oil. And any person found so doing will be prosecuted to the full extent of the law. The practice, for the sake of saving a few cents at the expense of health, has become so prevalent of using coal oil, New Era, Wild Fire Jack, and many other such names given to the oils, that I must insist upon its disuse, as the same vitiates the ventilative current to such an extent that it proves injurious to the health and safety of persons employed in coal mines. The fumes produced from this bad oil seriously affect the sanitary condition of the best ventilated mines. Hence I urge upon superintendents, or persons in charge, to give this matter their immediate attention. It is true that no oil is fumeless, but we certainly can improve immensely upon the contemptible stuff now in use at many of the mines.

T. D. JONES,
Inspector of Mines.

HAZLETON, *November 27, 1880.*

Explanations to the Accompanying Map of the Hazelton No. 6 Colliery.

In order to describe the workings and the mode of ventilation in this colliery, I have prepared the accompanying map to illustrate the plan of opening breasts, driving gangways, air-ways, &c.

The slope is down to the local basin, south of the main basin, in the Mammoth vein, a distance of four hundred feet, varying in inclination from $27\frac{1}{2}°$ at top of slope to 3° near the bottom. It will be seen, by referring to the map, that the synclinal axis dips to the east and west of the slope, though a little more rapidly in the latter direction, requiring four gangways to be driven, one on each dip of the vein, which affords a very convenient and effective way of conducting the ventilation, an advantage which many of the coal beds do not have, owing to the irregularity and contraction of the veins.

DESCRIPTION OF VENTILATION.—Persons familiar with underground workings will readily comprehend the method of ventilation, by glancing over the map, without giving a detailed account of the manner by which it is conducted. However, there are others who have but a slight idea how our mines are ventilated, and to those it is intended to describe, in brief, the most important points in connection therewith. There are three inlets—the slope, the traveling-way, and the air-hole—in the west gangway; the former being the main inlet, others are regulated to suit the requirements of the mines. It will be observed, on the map, that at the bottom of the slope, when the gangways are turned off, the air is split, as indicated by the arrows, one current going to the east gangway, the other to the west. A little further on another gangway branches off to the south from the main gangways, where each of those currents are again split, giving to each district an independent air current; from thence the air, including the split in the traveling-way, is circulated through the breastings to the return air-ways, and again unite at the bottom of the outlet leading to the fan.

The ventilation is produced by a 16-foot diameter fan, capable of exhausting sixty thousand cubic feet a minute, if run up to its maximum speed. December 18, 1880, I measured the air, and found it to be as follows:

Measurements in outlet, 43,500 cubic feet a minute, fan running eighty-six revolutions; measurements near face of east gangway "A," 13,500 cubic feet per minute; near face of east gangway "C," 8,875 cubic feet a minute;

near face of west gangway "A," 8,900 cubic feet; near face of west gangway "C," 5,200 cubic feet a minute; in the two back gangways, 2,500 cubic feet per minute. Number of men working in those places were thirty-seven, ten, thirty-three, nine, eight, respectively. Temperature in the mines fifty degrees, outside thirty-five degrees, increase in consequence of the combustion of lamps, respiration of men and animals, &c., fifteen degrees. To afford a better knowledge of the ventilation, I annex to this report the air measurements, returned to this office for the month of December, 1880, by the mine boss, in compliance with the requirements of the "ventilation act," which shows the number of cubic feet of air, and the number of men in each split separately.

HAZLETON, *December 4, 1880.*

T. D. JONES, Esq., *Inspector of coal mines for the South District of Luzerne and Carbon counties:*

SIR: The following is a true report of air measurements for the month of December, 1880:

LOCAL NAME OF EACH SPLIT.	Mode of ventilation.	Revolutions of fan per minute.	No. of splits or currents.	No. of cubic feet in inlet.	No. of cubic ft. in face of gangw'y	No. of cubic feet at outlet.	No. of men & boys in each air cur.	No of mules.	Temp't're above ground.	Temp't'e in face of gangway.
Slope No. 6, East gangway, "A," . . .	Fan	60	4	30,000	9,600	30,900	37	4	35°	50°
Do. West gangway, "A," . .	. . .	. . .	. . .	. . . .	5,600	. . .	30	3	. . .	54°
Do. East gangway, "C," . .	. . .	.	. . .	. . .	8,000	. . . .	12	2	. . .	53°
Do. West gangway, "C," . .	. . .	. . .	. . .	.	4,000	. . . .	11	2	. . .	52°
Total measurements for week ending December 4, 1880, ...	Fan	60	4	30,000	27,200	30,900	90	11		
Slope No. 6, East gangway, "A," . . .	Fan	56	4	27,800	9,000	28,800	37	4	33°	52°
Do. West gangway, "A," . .	. .	. . .	. . .	. .	5,200	. . . .	30	3	. .	53°
Do. East gangway, "C," . . .		. .	. .	. . . .	7,500	. . . .	12	2	. . .	5.°
Do. West gangway, "C," . .	. . .	. . .	. . .	. . . .	3,700	. . .	11	2	. . .	50°
Total measurements for week ending December 11, 1880, ...	Fan	56	4	27,800	25,400	28,800	90	11		
Slope No. 6, East gangway, "A," . . .	Fan	50	4	25,000	8,000	26,100	37	4	30°	5 °
Do. West gangway, "A," . .	. .	. .	.	. . .	4,700	. .	33	3	. . .	54°
Do. East gangway, "C," . . .	. .	. .	. . . .	. . . .	6,600	. . .	10	2	. .	52°
Do. West gangway, "C," . .	. .	. .	. . . .	. . . .	3,330	. . .	17	2	. . .	51°
Total measurements for week ending December 17, 1880, ...	Fan	50	4	25,000	22,630	26,100	97	11		
Slope No. 6, East gangway, "A," . . .	Fan	50	4	25,000	8,080	26,100	37	4	30°	5 °
Do. West gangway, "A," . .	. . .	. . .	. . . .	. .	4,600	. . .	30	3	. . .	54°
Do. East gangway, "C," . . .	.	. . .	. .	. . .	6,660	. . . .	12	2	. . .	52°
Do. West gangway, "C," .	. .	. . .	. . .	.	3,300	. . . .	11	2	. . .	53°
Total measurements for week ending December 24, 1880, ...	Fan	50	4	25,000	22,640	26,100	90	11		

AUGUST YAGER,
Inside foreman, at Hazleton No. 6 Colliery, for A. Pardee & Co.

The airways of late years, which are decidedly preferable, are generally driven, where conditions are suitable, towards the top or roof sufficiently elevated so that the coal, when dumped from the small airway car into the cross-hole, driven from the gangway to the airway, will run into the main car on the gangway, thereby saving the labor of shoveling the coal into the car, as the case would be if the airways were driven on a level with the gangway. And further, it is the means, if the overlying measures contain a surplus of water, which is often the case, causing heavy crushing on the gangways, it will drain that water and ease the crush or "squeeze" on the workings. The cross-holes from the gangway to the airways are intended to be driven every sixty feet, and the cross-cuts, through the pillars, for airing the breasts, driven as often as circumstances require, but the first should not exceed from thirty to forty-five feet, and as the succeeding cross-cut is driven the first should be closed to course the air to the face of the working places. By looking at the cross section on the map, the location of the airway, gangway, and the inclination of the vein can be seen.

Opening breasts.—The plan of opening breasts depends a great deal upon the pitch and character of the vein. Where the same is horizontal, and likely to continue so, the car is taken into the breast or chamber, as it is called at some collieries in the Wyoming region, but when the seam has pitch enough, say twenty-five degrees, the coal is run on sheet iron to the gangway and shoveled into the car. If the vein is pitching thirty-five degrees and upwards, a chute eighteen feet long by ten feet wide by six and a half feet high is driven up the pitch when a battery is erected against the pitch (see plan of opening breast at Hazleton mines accompanying this report) to prevent the coal from rushing too rapidly into the chute, and to afford the laborer a convenient place to select the refuse from the coal. Two man-ways are carried up these breasts by placing props about six feet long, four and a half feet apart, and eight inches in diameter, against the rib or pillar, and afterwards planked over. The most inconvenient pitch for driving up the breast or rather for getting the coal to the gangway, is when the inclination of the vein is too much for the car to follow the miner as he advances on the face, and not sufficient to carry the coal, as is the case in some parts of the mine of which the map herewith illustrates. The section taken through breast B, (see map,) shows how the coal is conveyed to the gangway in such breasts. It will be observed that during the driving of the first ten or fifteen yards, the coal is buggied to the gangway and re-loaded into the car. After the above distance is attained, a trestling is built to a level of the first dotted line on the section, elevating the buggy road to the height of the car, so that the coal buggied can be dumped directly into it. When the buggy road can no longer be continued towards the face, owing to the pitch, the trestling is again raised sufficiently high to allow of putting in a chute large enough to hold a car of coal, into which the coal, buggied on the second trestling, is dumped and then loaded in the car. In course of time the trestling is again raised and the chute continued to the point elevated, and the same operation is repeated from time to time as the miner

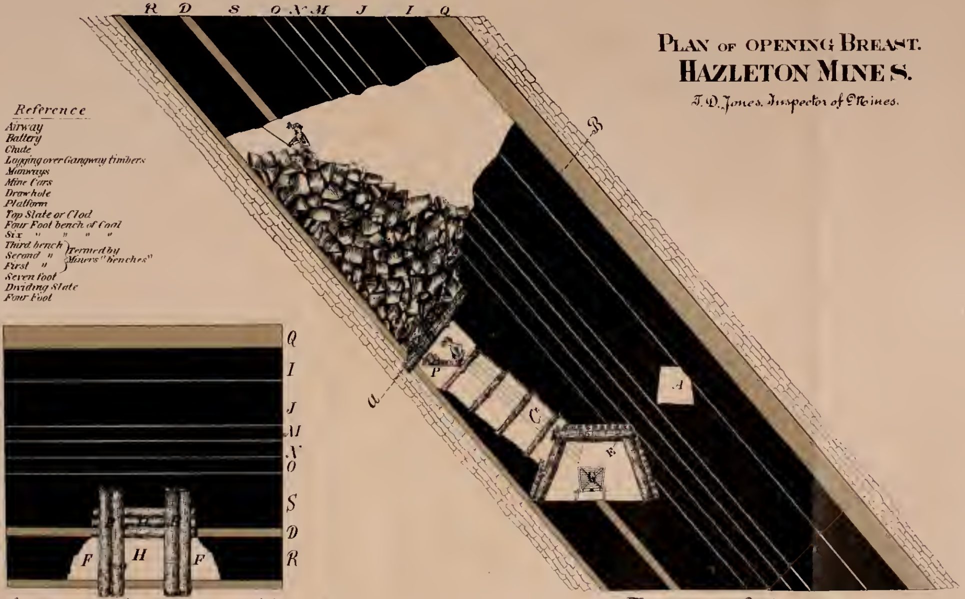
G BREAST.

MINES.

or of Mines.

PLAN OF OPENING BREAST.
HAZLETON MINES.

T. D. Jones, Inspector of Mines.



Reference

A	Airway	
B	Battery	
C	Chute	
E	Lagging over Gangway timbers	
FF	Manways	
G	Mine Cars	
H	Drawhole	
P	Platform	
Q	Top Slate or Clod	
I	Four Foot bench of Coal	
J	Six " " " "	
M	Third bench	Termed by Miners "benches"
N	Second "	
O	First "	
S	Seven foot	
D	Dividing Slate	
R	Four Foot	

Longitudinal Section through line A-B.
Scale 15ft to an inch.

Transverse Section;
Scale 15ft to an inch.

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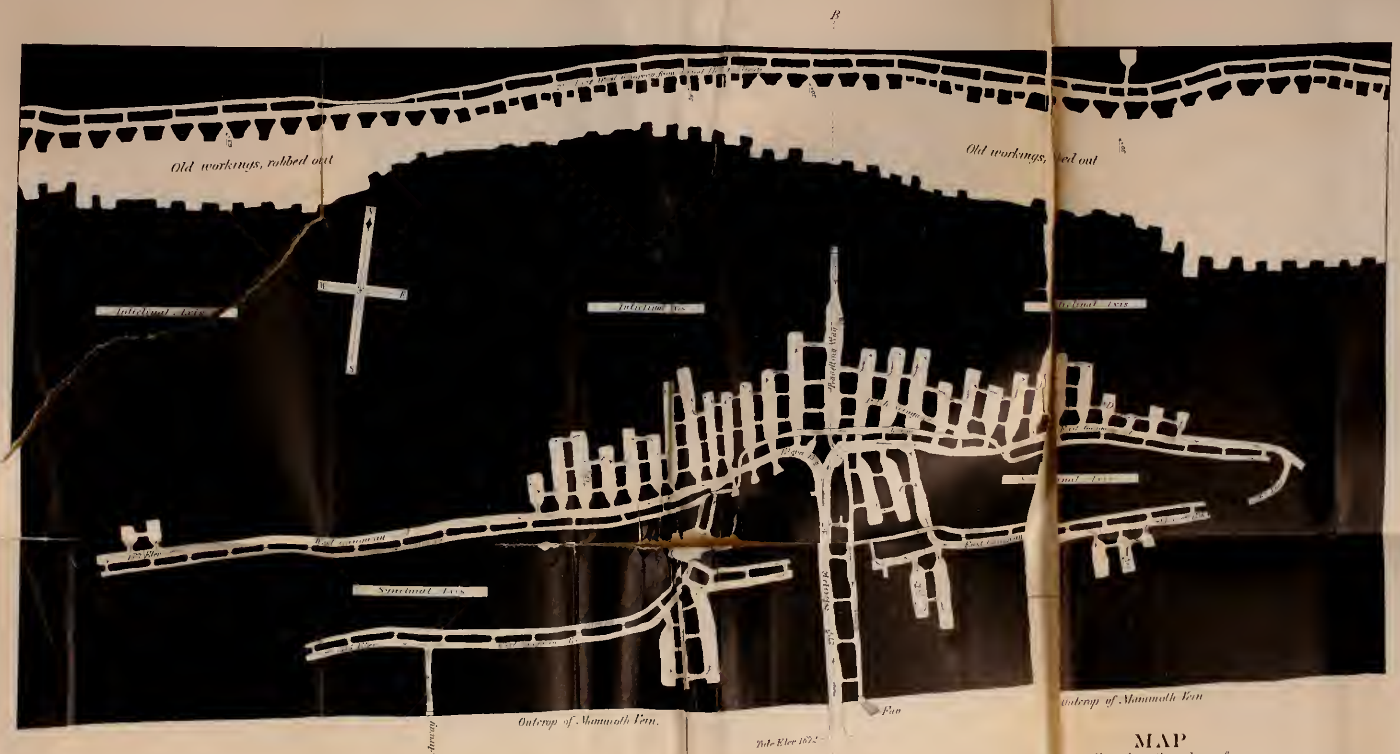
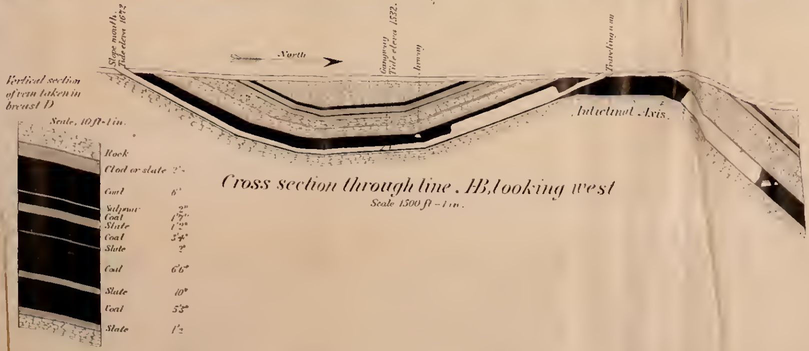


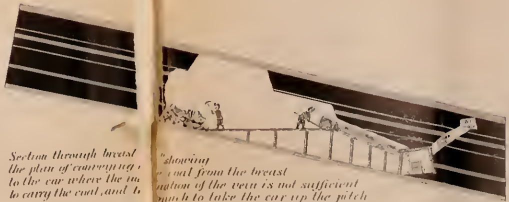
MAP
Showing the plan of
WORKIN AND THE MODE OF VENTILATING
HAZLET N No 6 COLLIERY OPERATED BY
A. PARDEE & Co.
Scale 150 ft. 1 in.



Vertical section of vein taken in breast D

Rock	
Clod or slate	2'
Coal	6'
Sulphur	2"
Coal	1'7"
Slate	1'2"
Coal	3'4"
Slate	2"
Coal	6'6"
Slate	10"
Coal	5'3"
Slate	1'2

Cross section through line AB, looking west
Scale 1500 ft - 1 in.



Section through breast "showing
the plan of conveying e coal from the breast
to the car where the in ation of the vein is not sufficient
to carry the coal, and t much to take the car up the pitch

Scale, 30 ft. 1 in

T.D. Jones, Inspector of Mines.

drives up his breast. In some cases, whereby the chute is raised to the roof, a second chute and buggy road is started, but as this entails an extra expense of about fifteen cents per ton, it is generally avoided and is only done where coal cannot be advantageously and profitably mined otherwise.

The miner is paid forty-two and a half cents per ton, on the basis, for mining, and an additional five cents per ton when the coal has to be buggied for the first forty yards from the gangway, and ten cents per ton for a greater distance, &c. The cross section was taken through the slope and terminates in one of the breasts driven up from Laurel Hill colliery. The coal on the anticlinal (see map) will be mined by stripping, *i. e.*, the coal unearthed and mined on the surface, and will amount to about 200,000 tons.

The coal from No. 6 slope is hoisted direct into the breaker by a pair of engines located back of the breaker. They ship about six hundred and fifty tons per day. The mine is drained by a "Thatcher pump," placed at the bottom of the slope. The dimensions are, water cylinder, twelve inches; steam cylinder, twenty-four inches; length of stroke, thirty-six inches.

Mine Fires.

DAMAGES TO PROPERTIES, &c.—Under this head comes the burning down of breakers, mine fires, &c. We have been very fortunate, considering the number of breakers in the district, from fires. Only three breakers have been burned down during the past six years, an account of which will be found in the reports of 1876 and 1879. We have been comparatively free from mine fires this year, except one at Council Ridge No. 2 colliery, located at Eckley, which occurred about the close of the year in the outlet from the boilers that are placed in the mines, but was extinguished without doing much damage. The mine fire that took place in East Sugar Loaf No. 2 colliery, (Stockton,) also that of colliery No. 1, of the same place, in 1875, I am happy to state have been put out by partially drowning and putting in stoppings to exclude the air. (See an account of improvements at these collieries in another part of this report.)

Coal mined by "Stripping."

A great deal of coal is now mined in this district by what is termed stripping; that is, the coal is unearthed, or the surface is taken off, and the coal mined in daylight. The annual production from this source, at present, is about 200,000 tons, and the total estimated acreage to be stripped, so far as we can ascertain at the present time, is about 45. The vein, which is the mammoth, will average about 20 feet thick of coal; hence, we have about 1,451,970 tons of coal, reckoning a cubic yard to the ton, to be mined by stripping. It is said by reliable authority that it pays to strip coal where the earth does not exceed a foot of clay for a foot of coal. Ordinarily, we have three feet of coal for every foot of earth stripped, proving very remunerative, as it is about twenty cents per ton cheaper to mine coal by stripping than otherwise. Of course, there is a limit to this mode of mining, and it cannot be done profitably when the vein carries its overlying measures.

Improvements at Upper Lehigh collieries.

A new slope is being sunk in the Green Mountain basin, belonging to the Upper Lehigh Coal Company. The slope is down 300 feet from the surface, dipping at an angle of twenty-one degrees at the outcrop, and varying in pitch to about twelve degrees at the above distance. They are sinking the slope in the bottom bench of coal which is from four to five feet thick. The thickness of the upper portion of the vein ("nine foot") has not yet been ascertained in the slope, but it is found to be, by shafting, about seven feet, making in all a vein about twelve feet thick. The dividing slate, it is said, is considerably thicker at this locality than at their other collieries, but as it varies so much in thickness at different places it cannot be determined till the vein is properly opened out. The coal is of a very fair quality, characteristic of the Buck Mountain vein.

It is intended to drive the slope to the basin at once, and then drive a hole to the surface on the opposite pitch for a second outlet. There is nothing new to note about their No. 4 colliery, except the connection made with No. 2 and the change made in the hoisting machinery, which has greatly increased their capacity.

In colliery No. 2 they have sunk an underground slope in a local basin located in the southeastern portion of the workings. A letting down plane is made at a short distance to the southwest of the bottom of slope No. 2 to let the coal down from the several counter gangways to a level with the main west gangway driven from foot of slope.

This letting down plane is somewhat different in its *modus operandi* to the ordinary balance plane, inasmuch as the cars are let down from the various counter gangways to a level with the main gangway by a stationary engine placed at the bottom of the plane. A horizontal sheave is put at the head of the plane, around which the rope goes, and back to the hoisting drum at the bottom. The plane is divided into as many counter gangways as circumstances, from time to time, require. The tracks in the counters are laid in a switchback form. The empty road is elevated about three feet higher than the loaded one, so that when the trip of empty cars are hoisted up the plane and dropped back into the counter the cars will run by gravity to the counter gangway turnout. The loaded tracks are also laid in each counter, with a descending grade to admit of the cars feeding themselves.

In brief the manner of letting the coal down from the counters is as follows: 1. The engine hauls two or three empty cars, as the case may be, up the plane past counter No. 1, then the engineer reverses his engine (after the switch is turned by the "hitch on,") and the cars are let back into said counter, the hitcher on unhooks the rope and hitches on to the loaded cars which are then hoisted out of the counter, past the switch, and are then let down to the bottom lift. The plane is nine hundred and ninety-one feet long, pitching about twenty degrees at a point of eight hundred and eight feet; on the same a counter is turned off to the west and connects on a level with the east gangway driven from slope No. 3, now abandoned as the coal can be taken *via* of the plane which is quite a saving to the company. I had intended making a sketch of the plane to accompany this report, but as my time is occupied at other work, I hope the description given will be explicit and satisfactory.

There are a number of collieries in the district where this manner of operation could be used to an advantage and a great deal of money saved annually.

The condition of the mines on the whole is commendable. Facilities for hoisting the coal, men employed, &c., *vide* table No. 3 of this report.

Improvements at West Cross Creek Colliery, (Gowen.) Operated by Coxe Bros. & Co.

This colliery has not been shipping coal since my last report, and not likely to do so until next spring, as it will take them until that time to complete their improvements, which have been carried on very extensively during the whole year, such as driving tunnels, sinking slope, re-timbering and widening out old abandoned gangways, building new railroad tracks, remodeling the breaker, &c. A new slope has been sunk on a pitch of about fifteen degrees, across the pitch of the vein, to take the place of the trial slope, and to facilitate the hoisting of the coal. They have driven about six hundred feet of a gangway, including east and west of the slope, which affords sufficient room for the opening of fifteen breasts, with a range of about eighty yards on a pitch of forty-five degrees.

The following is a vertical section of the vein taken in the face of the gangway, December 14, 1880: Top clod—mining, nine inches; sulphur, eleven inches; slate, three inches; good coal, three feet ten inches; slate, two inches; coal, three inches; slate, four inches; coal, one foot three inches; slate, one inch; bottom bench, good coal, three feet eight inches; mining, four inches; total thickness, eleven feet ten inches; refuse, two feet ten inches; total coal, nine feet. This vein which is the Buck Mountain, is subject to many sudden changes, and varies in character very frequently, particularly in this locality. The section shows that the vein contains about twenty-four per cent. of refuse, at the place where it was measured; however, it is likely to vary considerable from this; in some places it may prove to be better, and at other points it will turn out worse.

The ventilation for sinking the slope, and driving the gangways was produced by a four and one half feet diameter fan, producing about five thousand cubic feet of air a minute. The fan was placed on top of the slope, and the air forced down through a fourteen inch by fourteen inch air pipes. This method of ventilating a new opening, is much preferable, in my opinion, to any other. The old practice of producing a current of air by inserting the exhaust steam from the donkey pump into the air pipes, or by bratticing or partitioning a portion of the slope off, is done away with, as it deserves to be, except in temporary cases. When the colliery is properly opened out, doubtless, a large fan will be erected, if needed. At a point of two thousand four hundred feet east of the slope, a tunnel three hundred and thirty-nine feet long has been driven, cutting the same vein that the slope is on. The west gangway, unless it should be cut out by a fault, will connect with the east gangway driven from the slope. The coal from the tunnel and surrounding drifts, will be hauled to the breaker by a locomotive. It is difficult to estimate the capacity of production for 1881, but we can venture to say, that it will not be less than four hundred to five hundred tons of coal per day. This company have spent a large sum of money in developing this property, which has given employment to great many persons, and it is sincerely hoped that they will be reimbursed for their investments, which they richly deserve.

Improvements at Middle Cross Creek (Derringer) Colliery. Operated by same Company.

This colliery is located about two miles east of Gowen, in the Black Creek basin, and from present appearances promises to become a very productive colliery. They are still continuing the sinking of the trial slope, which is now down three hundred and fifty feet from the surface, dipping north, at the outcrop, 15°, and increases, at a distance of about one hundred and fifty feet, to 60°, and at three hundred and fifty feet from the surface it is 75°. They are now sinking a rock slope through the overlying measures, from the knoll over the slope mouth, and a little way to the east of it, to connect, in the vein, where the inclination becomes very steep, so as to have a uniformity of pitch, together with the view of affording a better location for the breaker, which will likely be built during the coming summer.

They have erected a very large steam saw-mill, and a number of very *substantial* and *comfortable* mine-houses for their employés, which is certainly a credit to the firm.

The *ventilation* for the opening of this mine is produced similar to that at West Cross Creek colliery. A small fan is placed outside, driven by a small engine, and the air is conducted through wooden boxes down the slope to the men.

They have also built a wash-house for the men to wash themselves when returning from work.

A vertical section of the vein is as follows: Top clod-coal, one foot; slate, eight inches; coal, one foot six inches; dividing slate, one foot two inches; coal, one foot two inches; slate, one inch; coal, two inches; slate, one and a half inches; coal, three feet six inches. Total thickness, nine feet four and a half inches, of which two feet one half inch is refuse, and seven feet four inches coal.

Improvements at East Cross Creek (Tomhicken) Colliery. Operated by the same Company.

This colliery is located in the Black Creek basin, about five miles east of Gowen, or seven miles west of Hazleton. A slope has been sunk on the north dip of the B vein, at an angle of about fifteen degrees, to the basin, a distance of three hundred and ninety-nine feet.

A section of the vein, in the basin, is as follows: Top slate—mixture of coal and slate—two feet nine inches; slate, three inches; coal, nine inches; dividing slate, two feet; coal, eight inches; slate, five inches; bottom coal, three feet eight inches. Total thickness, ten feet six inches.

Overlying this vein, with an intervening slate of about seven feet, is another vein of excellent coal, on which a slope, two hundred and ten feet long, was previously sunk, dipping south at an angle of forty-two degrees on top, and thirty-three degrees near the bottom.

A section of this vein is hereto annexed: Top bench of coal, three feet; second bench of coal, one foot eight inches; good coal, two feet seven inches; slate, five inches; good coal, three feet; dirt and slate, two inches; coal, one foot eight inches. Total thickness, twelve feet six inches, and only seven inches of refuse in the whole vein. They intend sinking a shaft at the lowest point in the basin, to penetrate both veins. It is probable that the breaker will be built as soon as the vein is sufficiently and satisfactorily developed.

Improvements at Black Ridge Colliery.

This is a new colliery, located about four miles west of Hazleton, at Conyngham station, in the Black Creek basin. The veins so far proven are said to be three in number. and the persons in charge are of the opinion that they are splits of the Mammoth vein. Whether this is so or not time alone can tell, and we must wait for the future development, as they vary much in formation to anything we have in this locality. The slope is down to the basin, a distance of two hundred and seventy feet, dipping at an angle of forty-two degrees at the top of slope, seventy degrees half way down, and thirty-eight degrees near the bottom of the slope. It is said that there are two veins overlying the one the slope is sunk on, one of which was lately cut by driving through an intervening slate of seven feet thick, and proven to be about fifteen feet in thickness, and of superior quality of coal. The following is a vertical section of the slope vein: Top clod, rough bird-eye coal, one foot; slate, seven inches; coal, nine inches; dividing slate, seven inches; coal, two inches; slate, five inches: coal, five feet—total, eight feet six inches.

The overlying vein is very pure, contains scarcely any refuse, and is similar in character and quality to the overlying vein at Tomhicken, continuation of the same basin. In geological order, I would term the vein on which the slope is sunk in the D, or Wharton, and the one above it the E, or Mammoth. Having located either of these two veins, the others can readily be named in their proper order. The present prospect is favorable for a large yield of coal, and the company are using every effort to push things right along, in order to commence shipping coal by the first of April next. They have in course of construction a large breaker, with the latest improvements for the preparation of coal. The hoisting engines, (fourteen inches by thirty inches,) are located on the knoll back of the breaker, and the steam-boilers, six in number, are situated near the slope entrance. The second outlet is now being made, and will contain fifty square feet area, and soon as completed a fan sixteen feet in diameter will be erected to ventilate this mine. The colliery will be operated by the Black Ridge Coal Company.

Improvements at Mount Pleasant Colliery. Operated by Pardee & Sons.

The improvements at this colliery have been very extensively carried on during the year just ended. They have sunk an underground slope on the north dip of the Wharton vein, a distance of two hundred and twenty-five feet to the basin. The pitch of the slope varies. At the top it is twenty-five degrees; half-way down it is seventy-five degrees ; near the bottom, or basin, it is ten degrees. The vein is in very good condition, and bids fair to yield a large amount of coal. To hoist this coal to the level of the main workings, they have erected a pair of engines, the dimensions of which are twelve inches by twenty-four inches. The steam will be conveyed to them by means of a ten-inch diameter bore-hole, put down from the surface, the length of which is one hundred and eighty feet. *The ventilation*, at present, is all that can be desired.

The average air-measurements for December is hereby annexed : Inlet, thirty-six thousand three hundred and fifty-three cubic feet a minute ; outlet, thirty-six thousand five hundred and fifty cubic feet a minute ; in face of gangway "A," four thousand eight hundred cubic feet a minute ; number of men, forty-one. In face of gangway " B," eighteen thousand four hundred cubic feet a minute ; number of men, eleven. In No. 2 plane gangway, eleven thousand nine hundred and fifty cubic feet per minute ; number of men, thirty-four. The current in gangway " B " also ventilates twenty-nine men in the Wharton vein, in the adjoining colliery.

Mount Pleasant Slope, No 1.

This slope, which is located about three thousand three hundred feet east of No. 2, was drowned, abandoned, and the coal considered, by the parties then operating, to be worked out. During the latter part of 1879, the present lessees pumped the water out and have since found that the slope contained a great deal of unworked coal. The slope is sunk on the south dip of the mammoth vein, a distance of three hundred and seventy-two feet to the basin, at an angle of thirty-eight degrees. The basin of this vein terminates or " spoons out " at a point of about fifteen hundred feet west of the slope. The total thickness of the vein is about twenty-three feet, but only eighteen feet of it is being worked, owing to the excessive thickness of the dividing slate, (eight and a half feet,) and the four foot or bottom bench being unusually thin. I am of the opinion, from present indications, that they will get from this old slope not less than five hundred thousand tons of marketable coal, which was supposed by many to be lost. A letting plane is now being driven, in the axis of the synclinal, to let the coal down to a level with the first lift, west gangway, as the basin rises too rapidly to follow it with the gangways. The turnouts, gangways, and the slope have been well re-timbered where it was considered necessary.

The ventilation, thus far, is produced by natural causes, and has met the requirements of the mines, but, if needed, the company will readily put up a fan during the coming summer. The following are the measurements of he air sent to this office for week ending November 29: N umber of cubic feet in inlet, thirteen thousand four hundred and thirty; in outlet, thirteen thousand five hundred cubic feet; in face of gangway "C," six thousand one hundred and twenty cubic feet; in face of gangway "A," six thousand two hundred cubic feet a minute. The number of persons working in each split or current of air were thirty and twenty-five, respectively. The coal from this slope is hauled to the breaker, located at slope No. 2, by a mine locomotive. The breaker has been overhauled in machinery and in carpenter work, by which its capacity will be increased from about four hundred to a thousand tons of coal per day, which they intend to ship during the coming season.

The colliery has been free from fatal accidents during the year. In slope No. 2, four persons were injured; three by falls of roof and sides, and one by a premature blast.

Colliery Improvements at Lansford Slope No. 4. Operated and owned by the Lehigh Coal and Navigation Company.

This slope took fire January 3, 1878, and was extinguished January 17, 1879, by means of closing up the mine, injecting steam into the same, and by inundating the two lower lifts with water. For information pertaining to the origin of the fire, &c., *vide* report of 1878. They commenced to hoist the water out June, 1879, and the mine was drained September, 1880. Since which time they have been repairing the slope, gangways, air-ways, railroad tracks, &c.

The gangways were not as much damaged as was expected, but the air-ways were very badly crushed which had to be re-timbered and enlarged for a distance of about six hundred yards east and west of the slope, from a four to a six feet collar and an eight feet leg. The slope is down six hundred and seventy-nine feet from the surface, at an angle of sixty-nine degrees.

The mine generates a large quantity of carbureted hydrogen gas, hence the necessity of enlarging the air-ways to about fifty-six square feet area. A new "second outlet" has been made the size of which is: collar, twelve feet; leg, ten feet; spread sixteen feet. The timbers are set about four feet from center to center with the pitch of the vein, which is about forty feet thick.

A twenty-one feet diameter fan is being built to be placed on top of the new outlet.

The timbering and the workmanship in the "new outlet" deserves special mention, and I must say, without fear of contradiction, that it cannot be excelled anywhere in the anthracite coal mines of the State of Pennsylvania, and doubtless many of our mine bosses would be profited by an inspection of the same.

Tunnel No. 6, on the north side of the valley, but in the same basin, still continues to produce its regular quota of coal and likely to do so for at least another year without making any improvements in sinking another lift, &c. The re-opening of the red ash vein gangway, overlying the mammoth vein, has greatly assisted in keeping up their production from the tunnel while the big vein gangway is being robbed back.

The ventilation is about the same as previously reported.

The east mountain tunnel, (a lift above No. 6 tunnel workings,) contracted to William H. Thomas is in good condition. The tunnel was driven to tap and work the outcrop of the vein, and has yielded a large quantity of coal.

The west mountain tunnel workings, contracted to Josiah Williams and John Davis, is becoming exhausted of coal which has necessitated the sinking of a slope through the old workings to point of about thirty feet below the level of tunnel No. 6 west gangway; this will give them access to a great deal of coal that was left in the abandoned portion of the colliery which was considered by many to be forever lost. The ventilation for the two mountain tunnels is produced by natural causes, and so far has met the requirements of the mines.

No. 8 Mountain tunnel was driven for the same purpose as those of No. 6. This tunnel is about two hundred feet long, cutting the vein about sixty feet below the croppings. The gangways cross quite a number of the old breasts worked up from tunnel No. 8, making it very difficult at some points to timber. The coal is let down to the breaker, or to a level of tunnel No. 8, by a letting down plane. They employ about thirty men and boys. Being so close to the outcrop of the vein the mine is easily ventilated.

Tunnel No. 9 colliery. The east gangway in the slope has been driven to the boundary line, while the west gangway is being worked around the point of the anticlinal into No. 2 slope basin, where a great deal of coal was left in the old slope workings. The condition of this mine is satisfactory, except the heat from the steam pipes in the tunnel, which I am told will be remedied by re-covering the pipes and putting up a new fan to cause a greater quantity of air to circulate through the tunnel.

Tunnel No 5 and Slope No. 7 are in about the same condition as was previously reported, except a letting down plane which was driven in the axis of the synclinal to let the coal down from a higher point in the basin to a level with the gangway.

Improvements at the Tresckow No. 7. Operated by E. B. Leisenring.

This is a new slope sunk on the north dip of the Wharton vein, a distance of about five hundred feet at an angle of forty-five degrees. A tunnel about one hundred and twenty-five feet long will be driven from this slope to cut the mammoth vein on the same dip as the slope. The territory to the east of the slope to be worked is about fifteen hundred feet long, which affords two lifts—exclusive of about two hundred and eighty feet of a lift—on the opposite pitch up to Yorktown No. 5, Wharton gangway. There is considerable big vein coal and a large quantity of Wharton vein coal to be mined west of the slope. The coal mined at this slope will be hauled to the Tresckow breaker by a mine locomotive. For hoisting the coal they have erected a single engine and six boilers to generate steam. For ventilation, a 16-foot diameter fan will be put up.

The coal in No. 6 slope is getting pretty well worked out, and may last another year and a half. Accidents to persons have been very frequent during the past year at this colliery. Four deaths occurred by falls of roof and coal; four others were injured through the same cause. Owing to the roof being so brittle, breaking around the heads of the props, I requested the mine boss to have the breastings, when the roof is bad, double timbered.

Colliery Improvements at Stout Colliery, (Milensville.) Operated by the Stout Coal Company.

This company has sunk a new single track slope through the old working of No. 5 in order to mine some coal that was left in the basin of the old slope, which will give them about sixty feet of a lift on each side of the synclinal, and will yield, together with what they will get by re-working the abandoned portion of the mine, about 50,000 tons of coal. The scarcity of coal at other collieries, as well as this has necessitated the re-laying of railroad track into old abandoned portion of the workings and the re-timbering of crushed-in gangways.

At No. 7 slope the company has put up a 16-foot diameter fan driven by a thirteen by twenty-four horizontal engine, with a capacity of about 40,000 cubic feet of air per minute. The condition of the colliery, on the whole, is very satisfactory. The company are also mining about one hundred tons per day of stripped coal, which is hauled with that mined at their new No. 5 slope, by a mine locomotive, to No. 6 breaker, where it is prepared for market.

Colliery Improvements at Hazleton No. 3. Operated by Pardee & Co.

This slope which was temporarily abandoned July 1, 1878, is now being re-opened, and will be ready to ship coal next spring. The gangways of the third lift, which were partly closed, are being re-timbered, and will doubtless produce a great deal of coal. A new breaker is in course of construction, and will be completed by the time the mine is properly re-opened.

The fifth lift of Sugar Loaf No. 1, is also being re-opened. This lift was drowned about ten years ago, for reasons best known to the company. The slope is down one thousand six hundred and fifteen feet to the basin. Vertical depth, seven hundred and forty-nine feet.

Crystal Ridge Slope, operated by the same company, has sunk another lift, which mades the third; the other two lifts being worked out, except some robbing, which is now being done.

Improvements at Laurel Hill Colliery. Operated by A Pardee & Co.

This colliery has been thoroughly overhauled within the past two years. An addition has been built to the breaker, and about half a dozen jigs or slate separators, together with some new machinery put in, thereby facilitating the labor, and greatly increasing the capacity of the breaker. A pair of thirty-two inch by seventy-two inch hoisting engines, with a sixteen foot diameter drum have been erected, to hoist the coal from the lower lifts direct into the breaker. The slope is down eight hundred and forty-two feet from the outcrop, at an angle about thirty-five degrees, including the new lift, newly sunk, and opens out quite a large field of coal. Through some local disturbances in the geological formation at the point of turning off the gangway, the vein was found to be dislocated, or split into several sections as it were, causing the vein to be thrown to the south, where it was discovered by a bore-hole, to be in good condition. A tunnel is now being driven, to cut the vein in the place found.

When the new lift is sufficiently opened out, and the connection properly made, the coal unmined in the old or the present levels will be taken out by means of a new slope, which is intended to be sunk at a place to be selected farther to the west, and hoisted to the second-lift gangway, through which it will be hauled, by a mine locomotive, to the bottom of the "third track slope," and hoisted directly on to the breaker. To the east of the slope, the company are driving two tunnels, about twelve hundred feet apart, to cut the Wharton vein, which underlies the Mammoth vein by an intervening strata at this point of about thirty feet thick, which will unquestionably give the company an access to a great deal of coal, a field of which covers all of the Hazleton basin, and is comparatively untouched. The condition of this mine is all that can be desired. The ventilation at present is very good, and meets the requirements of the mines. During next summer this colliery will be able, if necessary, to ship at least one thousand tons of coal per day.

Improvements at Spring Mountain Collieries, (Jeanesville.) Operated by J. C. Hayden & Co.

This company have drained one of the old abandoned slopes, situated one thousand and fifty feet west, and on the same dip of Slope No. 1, which will give them an accession to quite a territory of coal left in the old workings. When this slope was working, it appears that they only worked the two lower benches of coal—the four foot and seven foot, propping up the three benches and the six foot, which is equivalent to nearly one half of the thickness of the vein left in by working up the breastings, although not of so good a quality, yet it is marketable.

The drift workings are nearly finished. The south side of the local basin, and to the west of the slope, proving very faulty. A connection has been made between Slopes Nos. 4 and 5, which has greatly increased the ventilation, and if properly made to circulate to the face of the breastings, as the law requires, it will be satisfactory.

Slope No. 4 has been idle during the past year, waiting for the completion of driving about eighteen hundred and thirty feet of a gangway, nearly all in rock, from No. 4 to No. 7 slopes, an account of which was given in my last year's report.

Improvements at the Buck Mountain Colliery. Operated by the Buck Mountain Coal Company.

The improvements are such as sinking slopes, draining abandoned slopes' &c., for the purpose of re-working them. Slope No. 3, which was abandoned many years ago, has been pumped out, with the intention of mining the 6-foot bench of coal, and whatever they can get of the 9-foot bench, which was left in or unmined by the old mode of mining. Doubtless, from the appearance of the place, they will get a great deal of coal from this old slope, and the company will be amply paid for their trouble. A new slope has been sunk in the abandoned portion of No. 1 basin, to re-work whatever coal was left from old No. 1 slope workings.

An underground slope is being sunk in No. 7 to the basin, to work a portion of the coal that cannot be reached by the main slope. The coal from the inside slope, and from places in proximity thereto, will be hauled to the bottom of the main slope, by the endless rope system; a stationary engine being placed at the bottom of the slope for that purpose. A 16-foot diameter fan will be erected to ventilate the workings of No. 7, which, I think, will make things satisfactory.

Improvements at East Sugar Loaf Collieries. Operated by Linderman, Skeer & Co.

The fire in slope No. 2, which was reported in my last year's report, I am happy to state, has been extinguished by drowning and sealing up the mine. The water was pumped out, and they commenced to work about the middle part of November, that is to draw some loose coal from about a dozen breasts, and to re-timber the gangway and air-way. This mine generates a great deal of carbureted hydrogen gas, and has been very difficult to ventilate, owing to the old workings having been crushed, causing the air to leak through the loose coal, &c. However, a hole is now being driven from No. 2 to No. 1, which will eventually be the means of increasing the quantity of air, and to afford a traveling-way for the men, instead of the old second outlet.

The fire in No. 1, I believe, is also extinguished. At anyrate, after a careful inspection, for the purpose of ascertaining, I have failed to see any signs of fire in any part of the old works, but there was sufficient evidence that fire had been very strong at one time. No. 1 was flooded with water the same time as No. 2, which unquestionably was the primary cause of quenching the fire.

The water in No. 1 was left to rise about thirty-two feet vertical, and the communications between the workings being closely cut off by stoppings, &c., excluding all the air possible from the region of the fire. The persons in charge deserve credit for the manner in which they fought this fire, and I am sure that it is a source of satisfaction to every body to know for certain that it is out.

At slope No. 7 they have put up a 16-foot diameter fan, capable of producing forty-five thousand cubic feet of air a minute. The fan is driven by a 16″×24″ horizontal engine, direct acting, and is complete in every respect.

Description in detail of the Deaths enumerated in the tabulated statement, Table No. 1.

DEATHS FROM FALLS OF COAL, AND FALL OF ROOF.

ACCIDENT No. 1.—Albert Tobaski was fatally injured by a fall of coal in Cross Creek No. 1, January 14, 1880. He went to his brother-in-law's breast, who was working another breast close by, to see how he was getting along, and when he got there, they were ready to fire a " shot" or blast, and they all retreated from the flying missiles to a place of safety. After the blast went off, they were about to return to the breast, when the mine boss who was standing near, remonstrated with them about going back to their place too soon, as they should wait, and give ample time for the place to settle. Regardless of the advice, they proceeded immediately to the face of the breast, and the brother-in-law began to bar the loose coal from the face of the workings, while the deceased sat down under some top coal which projected over the bottom bench, when it fell, resulting as stated.

ACCIDENT No. 4.—Benjamin John, a miner, driving gangway at Buck Mountain No. 4, was killed by a fall of clod in the gangway, March 24, 1880. Benjamin was driving the counter gangway in the western portion of the colliery, and when moving back from the face, a large flag of slate covering the width of the gangway, fell on him. The mine boss told me that he had been with him in the morning, and requested him to start to timber the gangway, as the top was getting bad, and shortly afterwards the accident took place.

ACCIDENT No. 6.—Bernard Dugan, miner, aged ——, was instantly killed by a fall of coal in Laurel Hill colliery, March 23, 1880. The deceased was about to commence to blast up the four foot bench of coal, which was left by the primitive mode of mining, and before doing so, he was ordered to blast down some of the bench which projected over the head of the chute, as they looked rather dangerous, as stated by Mr. James Durkin, mine boss. After finishing, and making the top coal secured, he re-started to work on the bottom coal, when some of the top benches fell on him, with the above result. About half an hour previous to the occurrence, the mine boss had been with him, giving him instructions what to do, and had scarcely reached the bottom of the slope, when word came that Dugan was killed.

ACCIDENT No. 7.—William Harkins, miner, aged forty-five, was fatally injured by a fall of coal in slope No. 7, Lansford, April 8, from the effects of which he died, in the hospital in Philadelphia, May 1. He was working a breast in the Mammoth vein, and a fall of coal from the face of the breast fell on him, breaking his leg and seven ribs. Died in twenty-three days after the accident.

ACCIDENT No. 9.—Daniel McTague, laborer, aged twenty-one, working at Council Ridge, No. 2, was fatally injured, May 6, 1880, and died the following day. McTague was laboring for his uncle in the gangway in the underground slope, and was in the act of walking back from the face when a large flag of the dividing slate fell on his hip, knocking him down. Little was thought of the happening at the time, as he appeared to be scarcely the worse.

ACCIDENT No. 11.—James Ratcliff, aged sixty, was instantly killed by a fall of coal at Treskow, No. 6, May 21. This man's death happened, unfortunately, by his leaving his own work and going to assist his son, who was working a breast near the furnace, which the deceased was tending at the time. The son had just fired a shot, when the father arrived and went in to see the result of the blast, when the son remonstrated with him that it was unsafe. Heedlessly the old man commenced to pick, and no sooner had he done so, when the top bench of the Wharton vein fell, crushing him to death.

Accident No. 12.—Condy Daugherty miner, aged, forty, was instantly killed at Oak Dale, No. 2, by a fall of coal, June 1, 1880. Daugherty was one of two men working a breast in the big vein, and when ascending his breast, which was up forty yards from the gangway, a lump of coal of the two-foot above the four-foot bench fell on him. The two-foot projected about three feet over the four-foot, or bottom bench, from the face. His partner, who was working in the face of the breast at the time, said that he requested him to stay down, and not go up the breast, but not having anything to do at the time, as he had loaded his car, doubtless his intentions were to go up the breast to help his partner, and was caught in the attempt. I had every reason to find much fault with his partner at the time, for I considered there was negligence on his part, in not barring down the coal after he had sounded it, for it evidently was loose, as it fell shortly afterwards.

Accident No. 15.—Condy O'Donnell, miner, aged thirty-five, was instantly killed at Lansford slope No. 7, June 30, 1880. O'Donnell and his partner were putting in a length of manway and doubtless were anxious to accomplish their job before the boss came as it was measuring day. When the mine boss and fire boss came they called to the miners to stop putting down stuff as they wanted to go up to measure; after they reached the face the two miners stepped inside the manway to give room to the bosses when some coal slid out of the face, killing O'Donnell and injuring his partner. It is probable that the deceased came to his death through his eagerness to get in the length of manway as the same was in advance of the face of the breast at the time, and further it is evident from the conversation that ensued between them while the bosses were going up, that the boss would scold him for doing it.

Accident No. 19.—James Boyle was fatally injured by a fall of coal at Spring Brook, October 8, and died the same evening. Boyle was at work robbing back a gangway in the Wharton vein, and at noon he went home for dinner and after returning he fired a hole in the pillar which caused the coal over the platform to crush. The company men, who were putting in a platform in the adjoining breast, requested him to keep away and allow the place time to settle. After remaining a little while he attempted to do some work, but was compelled to retreat, and in course of time the driver brought them a car and they commenced to load it, the place still crushing. At last it became so bad that they had to get out of the way, but fearing the coal would break the handle of his sledge he rushed back for it and was caught in the attempt. This man came to his death through sheer recklessness, for they could not be a safer place to work underground.

ACCIDENT No. 21.—Cornelius Mulligan, road man, working at Tresckow No. 6, was instantly killed by a fall of roof October 19, 1880. The deceased and his partner were ordered by the mine boss to go to a miner's breast and put in a length of track and to shift the road to the upper side, finding that a center prop was in the way they concluded to knock it out, the miner whose work it was to remove the prop being engaged at the time filling a car asked Mulligan to do it, after making several ineffectual attempts in knocking it out with the sledge, without sounding the top to ascertain its condition, they did a little picking around the foot of the prop and gave it a few more blows when it was dislodged, and the weight it carried fell on top of Mulligan, resulting as above and slightly injuring his butty who was standing alongside of him at the time. These men might have known that it was dangerous to knock it out from the fact that it was hard to do it, being made so by the weight that was on top of it, for a prop that has but little weight to carry or support can very easily be knocked out.

ACCIDENT No. 22—Hugh Gallagher, miner, aged sixty-five, working at Tresckow, No. 6, was slightly injured November 11, by a fall of roof, and died November 15, 1880. Little was thought of his injuries at the time, and the parties in charge thought the matter was too trivial to report, (that is, the case was not serious enough to report.) The injuries received may have had something to do with this death, but I am of the opinion that it was not the primary cause. At any rate he was very old, and the hurt may have something to do with his death.

ACCIDENT No. 24.—Anthony McNelis was fatally injured by a fall of coal at Oak Dale, No. 2, November 15, and died on the 17th, 1880. McNelis was one of two working a "buggy breast," and had driven it up about twenty yards from the gangway. When they went to work Monday morning, they noticed that a fall of coal had taken place, and without looking if there was more likely to fall, the deceased commenced to work in the face, while his partner went to work in the cross-cut, when another fall took place, injuring McNelis, from the effects of which he died. The place, it is true, was very dangerous, as the coal was full of slips, and when I made some suggestions to the miner what to do to make it safe, he said that it was "too dangerous to do it," and yet he would work right under the danger rather than secure the place.

Deaths from Explosions of Blasting Powder and Premature Blasts.

ACCIDENT No. 23.—Benjamin Warren, miner, age fifty-four, working at Colerain, No. 2, was instantly killed by an explosion of a premature blast. The deceased and his laborer were working a breast in the Mammoth vein, and had fired that day about half a dozen holes, but the last one, by which he was killed, was drilled too small for the cartridge of powder (23″ long) to go to the back end of the hole, and he took the butt end of the drill to force it in, after giving it a few tamps with the drill the powder exploded, killing Warner and seriously injuring the laborer. The laborer told me that he begged of him not to force or drive it in, but he said that he had "often done it before, there was no danger." Warner was a man, to my knowledge, who had worked in extremely dangerous places, and yet he was killed through his own reckless act. This practice of driving the cartridge home, as it is called, is too common among miners, and it is miraculous how many of them escape being killed. The miner who was working the adjoining breast did the same thing the very day of the occurrence, but fortunately the powder did not explode.

Accident No. 3.—Thomas Berbeck, miner, was fatally injured by a blast at Cross Creek No. 2, February 17. The deceased and his brother were working a breast, and when about to fire a blast they retreated to the gangway for safety. After waiting about four minutes for the hole to go off, Berbeck returned to retouch the match, thinking it had "missed fire." When he had advanced within thirty-three feet of the hole it went off, throwing a lump of coal weighing about ten pounds, hitting him in the abdomen, inflicting such internal injuries as to cause death shortly afterwards. This is the first death that has taken place in this district from defective squibs, although I believe many miners have had very narrow escapes. The sulphur match squib is very deceiving, as it burns so dimly that the light cannot be seen a great way off, and miners very often return, as was this case, to re-light the match, when, to their surprise, they find the sulphur match still burning, and have to scud for life.

In Slopes.

Accident No. 5.—William Dando, miner, was fatally injured February 4, at Spring Mountain No. 4, operated by J. C. Hayden & Co. The deceased, with others, was at work timbering the slope, preparatory to turning off a counter-gangway from the slope to the west side. A scaffold had been erected across the slope, on which Dando and a carpenter were standing to trim the top coal, to give room for the collar, at which time a truck, with the pump-man on, was being hoisted up the slope, and they got off the scaffold and removed a portion of the plank back on each side of the track, which afforded ample room for the truck to go under, while they held one plank up, instead of throwing it back with the others. When the truck was near to where the scaffold was, the pump-man thought there was not sufficient room for the truck to go under the scaffold, and he jumped from the truck to run around to the scaffold and catch it on the upper side. This sudden action on the part of the pump-man caused the men to suppose that he fell under the truck, hence they forgot about the plank they were holding up, and left one end down too low, in consequence of which the truck caught it, and crushed Dando between the prop and the plank. He walked home after the accident and conversed quite fluently, but when reaction took place he died unexpectedly.

Accident No. 16.—Bernard O'Donnell, hitcher-on at bottom of slope at Council Ridge No. 5, was struck by a lump of coal that rolled down the slope, fracturing his scull. The accident happened July 9, and he died July 13, 1880.

Deaths by Mine Cars.

ACCIDENT No. 2.—Joe Kenney, car runner, was fatally injured at Tresckow No. 6, January 23d, by being run over by mine cars. He was bringing a trip of loaded cars down the grade, and it was supposed that he stumbled and was dragged under the cars, terribly lacerating his leg. He was taken to the hospital, where he died a few days afterwards.

ACCIDENT No. 17.—Charles Gillespie, hitcher at bottom of slope was fatally injured at Beaver Brook No. 4, September 1st. When the car was just being hitched, (was up perhaps fifteen feet from the bottom,) the swivel of the chain broke, letting the car back, which caught Gillespie while he was running away from the car up the turnout, jamming him between the cars and cutting his leg very badly. He was taken to the Pennsylvania Hospital, where he died in a few days.

ACCIDENT No. 8.—George Zierdt, aged 14, cut on the knee by being caught by mine cars at Highland No. 1, April 5, 1880, from the effects of which he died May 26th, following, from lock jaw.

ACCIDENT No. 11.—Abe Williams, driver, aged 20, at Ebervale No. 3, had a cut on the heel of the foot by the car jumping the track, resulting in death from lock jaw in two weeks after the occurrence. Here we have two accidents within nine days of each other which were considered, when they occurred, to be very trivial in their nature. Indeed, they were so slight that the superintendents did not think them important or serious enough to report until their deaths, which resulted quite unexpectedly.

ACCIDENT No. 18.—John Wolfskill, a lad 14 years of age, was fatally injured at the bottom of the new lift of Laurel Hill slope, September 2d, and died of his injuries September 16, 1880. The boy was employed at running a donkey pump which was situated at the bottom of the slope, and, while playing around, jumped on a loaded car which the gangway men were pushing into the bottom of the slope, and was jammed between the car and center prop.

ACCIDENT No. 20.—Patrick Gildea, driver, was instantly killed by mine cars at Cross Creek No. 1, October 15. The deceased and another driver were bringing a trip of loaded cars to the bottom of the slope from the inside turnout. The second car, which was loaded too high, caught in the chute platform, which threw it off the road, and in the attempt of pulling it on the track with the mules, Gildea, who was sitting on the front bumper of the car, fell and was run over.

ACCIDENT No. 25.—Abraham Stewart, driver, was fatally injured by mine car at Lattimer No. 2, from the effects of which he died in about two hours afterwards. The boy had a few leisure moments, and after eating a lunch he strolled up the west turnout about the same time that the empty car was being hauled from the bottom to the turnout or siding, passing the car opposite the loaded cars when it was stopped for changing the doors, which prevents the coal from falling off on the slope, from the empty car on to the loaded one, and when the driver started up the deceased got in between the timbers when the car was thrown from the track, caused by a sprag being on the rail, slewing the car across the road, the hind end of which struck him against the leg of the set of timbers, crushing his head and body very badly. This is one of those unavoidable accidents, a recurrence of which can only be prevented by the persons themselves in remaining at their work.

Deaths from Miscellaneous Causes, above ground.

Accident No. 14.—David Reese, slate picker at Spring Mountain (Yorktown) No. 6 breaker, was suffocated in the Pea Coal pocket, June 29, 1880. The boy complained to the screen boss that his fingers were sore, picking slate, and asked to be changed to shoveling the coal in the pockets, to which the boss consented. After dinner, he exchanged places with the boy that was shoveling, and in about twenty minutes afterwards he was discovered by the loader, who was drawing the coal into the transportation cars, coming through the gate. He gave the alarm, and the coal was left to run on the road, but not in time to save him alive. Had he not become entangled in the chute at the gate, it is likely that he might have been rescued alive. It is a practice too frequent among breaker bosses, in putting boys to do men's work, and very wrong indeed in placing them in dangerous positions where they are not capable of realizing the danger, as doubtless was this case. The boy was innocently shoveling in the pocket, the same being full of coal, when the loader opened the gate to let the coal out, the boy was sucked through as though it was in a whirlpool.

Accident No. 13.—Patrick McLaughlin, aged forty-five, engineer at the saw-mill at Latimer, was fatally injured June 9, and died June 11, 1880. The accident happened about 8, a.m. Shortly after starting to work, through the governor belt falling off the governor pulley, causing the engine to run at fearful velocity as to break the cylinder head, fly-wheel, the engine bed plate, and smashing things in general, as it was impossible to stop the engine, owing to the thread on the screw valve being stripped. The engineer hastened to the screw valve, as doubtless he had done before under like circumstances, to screw off the steam, but when he found the thread on the stem of the screw valve stripped, he hastened to the safety valve to let the steam escape, and was in the act of holding up the safety valve lever, when the whole thing collapsed. The rest of the men escaped uninjured, fortunately, but were terribly frightened when they realized the situation. Since the accident, things have been fixed up, and a throttle valve placed between the engine and screw valve to avoid a repetition.

Accident No. 26.—John Bach, Hungarian, working at the stripping of the coal at Hollywood colliery, was so severely hurt by a fall of clay, December 22, that he died on the way to the hospital the same evening. This is the second death that has occurred at "strippings" in this district, although it is the first at the above named colliery. One man was fatally injured at Colerain stripping in 1878, by venturing too far in the under cut to draw a fall of surface, and was caught in a similar manner as that of Bach.

TABLE I.—*List of accidents proving fatal in the South District of*

DATE.	Number of accident.	Collieries.	Names of Persons Killed or Fatally Injured.	Occupation.	Age.	Widows.	Orphans.
Jan. 15	1	Cross Creek, No. 1,	Albert Tobaski,	Miner,	38	1	2
23	2	Tresckow, No. 6,	Joseph Kenney.	Patch,	20	.	.
Feb. 17	3	Cross Creek, No. 2,	Thomas Berbeck,	Miner,	33	1	4
March 8	4	Buck Mountain, No. 4,	Benjamin John,	Miner,	36	1	4
22	5	Spring Mountain, No. 4,	William Dando,	Miner,	35	1	7
23	6	Laurel Hill, (old lift,)	Bernard Dugan,	Miner,	52	1	. .
April 8	7	Panther Creek, No. 5,	William Harkins,	Miner,	45	1	3
May 5	8	Highland, No. 1,	George Zierdt,	Patch,	14	. .	. .
6	9	Council Ridge, No. 2,	Daniel McTague,	Laborer,	21	. .	. .
14	10	Ebervale, No. 3,	Abe Williams,	Driver,	20	. .	. .
27	11	Tresckow, No. 6,	James Ratcliff,	Miner,	60	. .	. .
June 1	12	Oak Dale, No. 2,	Condy Daugherty,	Miner,	40	1	3
9	13	Lattimer, (Saw-Mill,)	Patrick McLaughlin,	Engineer,	45	1	3
29	14	Spring Brook, No. 6,	David Reese,	Slate-picker,	12	.	. .
30	15	Panther Creek, No. 5,	Condy O'Donnell,	Miner,	38	1	2
July 9	16	Council Ridge, No 5,	Bernard O'Donnell,	Hitcher-on,	26	. .	. .
Sept. 1	17	Beaver Brook, No. 4,	Charles Gillespie,	Hitcher-on,	28	. .	. .
2	18	Laurel Hill,	John Wofskill,	Pump boy,	14	. .	. .
Oct. 9	19	Spring Brook, No. 6,	James Boyle,	Miner,	40	1	5
15	20	Cross Creek, No. 1,	Patrick Gildea,	Driver,	20	. .	. .
18	21	Tresckow, No. 6,	Cornelius Mullegan,	Roodman,	35	1	6
Nov 11	22	Tresckow, No. 6,	Hugh Gallagher,	Miner,	65		.
11	23	Coleraine, No. 2,	Benjamin Warren,	Miner,	53	1	7
15	24	Oak Dale, No. 1,	Anthony McNeilis,	Miner,	45	1	4
19	25	Lattimer, No. 2,	Abraham Stewart,	Driver,	16	. .	. .
Dec. 22	26	Hollywood stripping,	John Bach,	Laborer,	27	1	2
		Total,				14	52

Killed,	10
Fatally injured,	16
	26

Luzerne and Carbon counties, during the year ending December 31, 1880.

Nature and Causes of Accidents.	NUMBER OF DEATHS. Falls of coal roof and sides.	Premature blasts.	In slopes.	By mine cars.	Miscellaneous above ground.	Total.
Fatally injured in another person's breast, by a fall of coal,	1					1
Fatally injured, by being run over by mine cars,				1		1
Fatally injured by a blast; thinking the match had quenched, he went back to relight it, when it exploded,		1				1
Killed in the gangway, by a fall of slate,	1					1
Fatally injured, by being crushed between a plank and center-prop, on the slope,			1			1
Killed by a fall of coal, two foot bench, while in the act of blasting up the four foot,	1					1
Fatally injured by a fall of coal; leg broken and ribs fractured; died in the hospital May 1, 1880,	1					1
Cut on the knee, by being caught by the cars; lock-jaw set in, and he died May 26, 1880,				1		1
Fatally, by a fall of the dividing slate, while laboring in the gangway,	1					1
Cut in the heel by a car jumping the track, which brought on lock-jaw; died in two weeks afterwards,				1		1
Killed by a fall of coal while assisting his son, after firing a shot,	1					1
Killed by a fall of coal in the breast; two foot bench, above the bottom four foot, fell on him,	1					1
Fatally injured by the breaking of the machinery; the screw valve was out of order. See explanatory notes,					1	1
Suffocated in the pea coal pocket at the breaker,					1	1
Killed by a fall of coal in the breast,	1					1
Fatally injured, by being struck by a lump of coal which rolled down the slope; died on the 13th, following,			1			1
Fatally injured by hoisting-chain breaking, car caught him on turn-out; died in course of a week afterwards,			1			1
Fatally injured; jammed between car and center-prop; died on the 16th of the same month,				1		1
Fatally injured by a fall of coal, while robbing back the gangway in the Wharton vein; died same evening,	1					1
Killed by falling under the cars in the gangway; car got off the road,				1		1
Killed by a fall of roof while knocking out a prop, which was set too near to the road,	1					1
Fatally injured by a fall of roof; died on the 15th, following,	1					1
Killed by an explosion of a premature blast in the breast,		1				1
Fatally injured by a fall of coal, from the effects of which he died on the 17th, following,	1					1
Killled by being caught between car and gangway timbers,				1		1
Fatally injured by a fall of clay at the stripping; he died on the way to the hospital, same day,					1	1
	12	2	3	6	3	26

Recapitulation.

	1880.	1879.
Exposions of carbureted hydrogen gas,		2
Falls of coal, roof, and sides,	12	15
Hoisting machinery breaking,	1	2
Premature blasts,	2	
Mine cars,	6	2
In slopes,	2	
Miscellaneous above ground,	3	4
	26	25

TABLE NO. II.—*List of Non-fatal colliery accidents in the South District*

DATE.		Number of accidents.	COLLIERIES.	PERSONS INJURED.
Jan.	10	1	Spring Mountain, No. 5,	John Bryant,
	13	2	Lansford, No. 9,	Mathew Ricket, (boy,)
	13	3	West Cross Creek, (Gowen,)	Lewis Schubart,
	14	4	Sandy Run,	Michael Doyle,
	15	5	Tresckow, No. 6,	John McCann,
	16	6	Sandy Run,	James Baskin,
	21	7	East Sugar Loaf, No. 2,	John Repko,
	21	8	Spring Brook, No. 6,	Stephen Howard,
	21	9	Ebervale, No. 3,	Dennis Boyle,
	22	10	Cranberry,	John Zell,
	23	11	Hollywood,	Thomas Richards,
	27	12	Harleigh, No. 4,	William Krugar,
Feb.	11	13	Upper Lehigh,	John Stacy,
	15	14	Harleigh, No. 1,	Ney Job,
	17	15	Lattimer,	Owen Castillo,
	17	16	Cross Creek, No. 2,	Patrick Diffioul,
Mar.	9	17	South Sugar Loaf,	Herman Richards, breaker boss,
	24	18	East Sugar Loaf, No. 5,	Peter Floyd,
	30	19	Sugar Loaf breaker,	Daniel Campbell, (boy,)
April	8	20	Panther Creek, No. 9,	William McLaughlin,
	9	21	Mount Pleasant,	Frank O'Donnell,
	10	22	Hollywood,	George Krissinger,
	10	23	Hazleton, No. 6,	Patrick Burk,
	12	24	Tresckow, No. 6,	Charles Fulda,
	12	25	Council Ridge,	Patrick O'Donnell,
	15	26	Council Ridge,	George Lutz, (boy,)
May	12	27	Spring Mountain, No. 5,	William Harner,
	18	28	Ebervale, No. 3,	James B. Miller, (driver,)
	19	29	Humboldt,	John E. Kelley,
		30	Highland, No. 1,	Owen R. Ownes,
une	7	31	Mount Pleasant,	Daniel Brenan,
	10	32	Upper Lehigh,	Richard Dudly,
	10	33	Panther Creek, No. 6,	Francis Shields,
	16	34	Highland, No. 1,	Morris Ulrich,
	19	35	Spring Brook, No. -,	Hugh Cole,
	23	36	Hazleton, No. 6,	Conrad Diesroth,
	24	37	Cranberry,	William Birch,

of Luzerne and Carbon counties, during the year ending December 31, 1880.

NATURE AND CAUSES OF ACCIDENTS.	NUMBER OF ACCIDENTS.								
	Explosions of CH4 gas.	Falls of coal roof and sides.	Explosions of blasting powder	Premature blasts.	Mine cars.	In slopes.	Miscellaneous underground.	Above ground.	Total.
Severely burned by an explosion of blasting powder, ignited by spark from his lamp,			1						1
Leg broken; his clothes caught in a revolving shaft, and he was whirled around against a post,								1	1
Three fingers cut off while in the act of sawing a plank at saw-mill,								1	1
Shoulder dislocated, caught between the car and prop, by leaning too far on the side of the car,					1				1
Thigh considerably hurt by being caught under the car while it was being dumped at the tip,								1	1
Leg broken and dangerously hurt by a fall of coal, while barring down the same,		1							1
Injured on the arm, jammed between the car and boiler-house,								1	1
Arm broken and injured otherwise by a fall of clod in the Wharton vein,		1							1
Leg broken and severely hurt about the body by a lump of coal rolling down the chute,		1							1
Cut in the head by a fall of clod. Not serious,		1							1
Seriously cut on the back of the head,		1							1
Injured by a fall of coal in the Wharton vein gangway,		1							1
		6	1		1			4	12
Cut on the leg by a piece of coal falling on the drill while he was sounding the roof,		1							1
Slightly injured while attempting to cross the hoisting rope,							1		1
Cut about head and body by a fall of coal. Not considered serious,		1							1
Leg broken by mine cars,					1				1
		2			1		1		4
Arm caught between two cog wheels while oiling machinery, necessitating amputation,								1	1
Injured on the leg by a rush of coal in the chute,		1							1
Arm broken by being run over by slate car while playing with same,								1	1
		1						2	3
Arm hurt by falling under the car,					1				1
Severely injured by premature blast, caused by squib missing fire,				1					1
Arm broken by falling down a distance of eighteen feet, caused by a plank, on which he was standing, breaking,								1	1
Badly cut on the head by a fall of coal,		1							1
Severely injured by a fall of coal while in the act of drilling a hole,		1							1
Arm broken by a lump of coal falling on it,		1							1
Dangerously hurt by being jammed between the and slate chute,								1	1
		3		1	1			2	7
Leg broken by a lump of coal falling on it in the Wharton vein,		1							1
Severely jammed between the car and door. The boy left the door and it closed when going through,					1				1
Arm fractured in assisting to put a car on the track,					1				1
Arm broken by unhooking the chain,							1		1
		1			2		1		4
Injured by a fall of clod, returned too soon after firing a shot,		1							1
Leg broken by being caught between stretcher stick and the car; caused by mule running away,					1				1
Foot amputated. Chain broke on letting down plane, and the car caught him at the bottom,								1	1
Severely burned by an explosion of blasting powder, caused by a spark from his lamp,			1						1
Back hurt and foot crushed by a fall of clod. He was sent to the hospital.		1							1
Badly bruised about the leg, caught between the tool-box and car,					1				1
Both legs broken near the thigh, by a piece of ths first bench of coal falling on him,		1							

TABLE NO. II.—

DATE.	Number of accidents.	COLLIERIES.	PERSONS INJURED.
June 25	38	Latimer,	William Hall,
26	39	Mount Pleasant,	Thomas Bryne,
28	40	Spring Brook, No. 5,	....
29	41	Spring Brook, No. 5,	....
30	42	Panther Creek, No. 5,	Thomas Moor,
July 8	43	Latimer,	Lawrence Mulhall,
10	44	Laurel Hill breaker,	John Heiser, (boy,)
12	45	Harleigh,	Frank Mulherron,
14	46	Upper Lehigh, No. 4,	Matthew J. Jones,
Aug. 6	47	South Sugar Loaf,	Andrew Cassidy,
16	48	Upper Lehigh, No. 2,	Fred. Walder,
24	49	Mount Pleasant,	Anthony McNully,
24	50	Highland, No. 1,	Robert Boyle,
26	51	East Sugar Loaf,	Joseph Unsko, Hungarian,
30	52	Hazleton mines,	James Armstrong,
Sept. 1	53	Laurel Hill,	Patrick Kennady.
2	54	Hazleton mines,	John Thorully,
4	55	Buck Mountain,	Evan Daniels, mine boss,
4	56	Highland, No. 1,	Thomas Mulligan,
6	57	Spring Brook, No. 5,	Neal Boyle, driver,
6	58	Laurel Hill,	Condy Kerney,
7	59	Cross Creek, No. 1,	Patrick Brislin,
16	60	Hazleton, No. 6,	John Cannon,
28	61	Highland, No. 1,	Barney Sharp,
29	62	Spring Mountain,	John Coyle,
Oct. 8	63	Lattimer breaker,	Evan Kulp,
9	64	Cross Creek, No. 1,	Robert Flenner,
12	65	Hollywood,	August Flall,
15	66	Milnesville,	Hugh Dolon,
	67	Oak Dale,	Patrick O'Donnell, (boy,)
16	68	Cranberry,	John Andrew,
18	69	Cranberry,	William Lamb,
20	70	Lattimer,	Timothy McAndrew,
22	71	Room Run No. 3,	James McCabe,
27	72	Hazleton, No. 6,	Barney Kilmartin,
28	73	South Sugar Loaf,	Daniel P. Myers,
Nov. 8	74	Panther Creek, No. 5,	Robert P. Black,
9	75	Panther Creek, No. 4,	John McCullion,
9	76	East Sugar Loaf, No. 1,	August Fueh,

Continued.

Nature and Cause of Accidents.	Number of Accidents.								
	Explosions of CH_4 gas.	Falls of coal roof and sides.	Explosions of blasting powder.	Premature blasts.	Mine cars.	In slopes.	Miscellaneous — underground.	Above ground.	Total.
Severely cut on the head by a fall of coal,	. .	1	. .	. .	. .	. .	. .	. .	1
Leg broken by a fall of coal,	. .	1	. .	. .	. .	. .	. .	. .	1
These two men were injured by a fall of coal while retimbering the slope. McGee had three ribs broken and Thomas was slightly hurt,	. .	1 1	. .	. .	. .	. .	. .	. .	1 1
Badly hurt by a fall of coal in the breast,	. .	1	. .	. .	. .	. .	.	. .	1
		8	1	. .	2	. .		1	12
Leg broken and head cut by falling from check battery to bottom of breast,	. .	. .	. .	.	. .	. .	1	. .	1
Injured on the leg; run over by slate car,	. .	.	. .	. .	. .	. .	. .	1	1
Leg injured; caught between guide rail and the rail,	. .	.	. .	. .	. .	. .	1	. .	1
Injured: struck by a car while crossing the slope at counter "J,"	. .	. .		. .	. .	1	. .	. .	1
						1	2	1	4
Severely cut about the head by a fall of coal,	. .	1	. .	. .	. .	. .	. .	. .	1
Severely cut on the head by a piece of coal flying from the drill, &c.,	. .	1	. .	. .	. .	. .	. .	. .	1
Leg broken by a fall of clod,	. .	1	. .	. .	. .	. .	.	. .	1
Leg fractured by falling under the car; he attempted to jump on the car in the slope while in motion,	. .	.	. .	. .	. .	1	. .	. .	1
Leg broken by mine car at bottom of slope,	. .	. .	. .	. .	1	. .	.	. .	1
Severely injured by falling from the transportation car at lump coal chute,	. .	. .	.	. .		. .	. .	1	1
		3			1	1		1	6
Dangerously injured by being thrown off the truck and tramped upon by a team of mules,	. .	. .	. .	. .	. .	. .	1	. .	1
Severely cut in the head by coal rushing out of the battery upon him,	. .	1	. .	. .		. .	. .	. .	1
Thigh bone broken by falling under mine car,	. .	. .	. .	. .	1	.	. .	. .	1
Amputation of a few toes by a fall of coal,	. .	1	. .	. .	.	.	. .	.	1
Head jammed between the cars,	. .	. .	. .	. .	1	. .	. .	. .	1
Leg fractured; caught between plank and the side of the chute,	. .	.	. .	. .	. .	. .	1	. .	1
Severely hurt by a fall of coal; he had left the top coal hang back two far,	. .	1	. .	. .	.	. .	. .	. .	1
Foot jammed between car and chute,	. .	. .	. .	. .	1	. .	.	. .	1
Severely bruised on back and leg by a fall of coal while barring down the same,	. .	1	. .	. .	. .	. .	. .	.	1
Injured in the Wharton vein by a fall of coal,	. .	1	. .		.	. .	. .	. .	1
		5	. .	. .	3	. .	2	. .	10
Injured by falling under the slate car by attempting to jump on it while in motion,	. .	. .	. .	. .	. .	. .	. .	1	1
Severely burned by an explosion of a premature blast while tamping the hole,	. .	. .	. .	1	. .	. .	. .	. .	1
Severely injured by a fall of coal at the stripping,	. .	1	. .	. .	. .	. .	. .	. .	1
Fracture of the ankle joint by some coal,	. .	1	. .	. .	. .	. .	. .	. .	1
Run over while playing at noon hour with the ash car; necessitating amputation of one leg and lacerating the other,	. .	. .	. .	. .	. .	.	. .	1	1
Cut on the arm while barring down coal,	. .	1	. .	. .	. .	. .	. .	. .	1
Severely injured by a fall of clod,	. .	1	. .	. .	. .	. .	. .	. .	1
Ankle injured by a fall of top coal while drilling a hole,	. .	1	. .	.	. .	. .	.	. .	1
Injured on arm and leg by falling under the car, on top of letting down plane while unhooking the chains,	. .	. .	. .	. .	. .	. .	. .	1	1
Arm badly cut by falling while running away from a blast,	. .		. .	. .	. .	. .	1	. .	1
Injured by some coal rushing upon him from the battery,	. .	1	. .	. .	. .	. .	. .	. .	1
		6		1	.	. .	1	3	11
Severely hurt: jammed between two cars on the gangway; recklessness of the bottom driver in leaving the car on the road,	. .	. .	. .	. .	1	. .	. .	. .	1
Severely burned about the hands and face by an explosion of gas; negligence of the fire boss in not examining the place,	1	. .	. .	. .	. .	. .	.	. .	1
Injured by falling under mine car while in motion,	. .	. .	. .	. .	1	. .	. .	. .	1

TABLE NO. II.—

DATE.	Number of accidents.	COLLIERIES.	PERSONS INJURED.
Nov. 9	77	East Sugar Loaf, No. 2,	Mathew Wyll,
11	78	Tresckow, No. 6,	Anthony O'Donnell,
11	79	Sugar Loaf, No. 2,	John Ripple,
11	80	Coleraine, No. 2,	Daniel Gillespie,
11	81	Ebervale, No. 3,	Hugh Boyle,
11	82	Room Run Tunnel, No. 2,	James Markley, fireman on mine locomo.
17	83	Stoute, No. 7, (Milnesville,)	Brook Andreas,
23	84	Panther Creek, No. 9,	Frank Heffelfinger,
30	85	Cross Creek, No. 1,	Thomas Williams,
Dec. 1	86	Tresckow, No. 6,	Evan Owens,
7	87	Cross Creek, No. 2,	Alex. Joiss,
8	88	Highland, No. 1,	James Burns,
9	89	Cranberry,	George Brost, (boy,)
17	90	Tresckow, No. 6,	Milton Sigfieldt,
20	91	Panther Creek, No. 5,	Joseph Elliott,
21	92	Humboldt,	John Patterson,
30	93	East Sugar Loaf, No. 2,	John Fox,

Continued.

NATURE AND CAUSE OF ACCIDENTS.	NUMBER OF ACCIDENTS.								
	Explosions of CH4 gas.	Falls of coal roof and sides.	Explosions of blasting powder.	Premature blasts.	Mine cars.	In slopes.	Miscellaneous - underground.	Above ground.	Total.
Injured on head and back by some coal falling on him,		1							1
Severely hurt on the shoulder by a fall of clod while preparing to stand a set of timbers,		1							1
Injured on the hip by a fall of clod,		1							1
Dangerously injured by an explosion of a premature blast while assisting the miner to tamp a hole,				1					1
Severely cut on the head by a fall of slate,		1							1
Skull fractured by mine cars while siding the same,					1				1
Leg broken by falling and coming in contact with the breaker machinery,								1	1
Injured by falling down the breaker steps,								1	1
Leg broken by a fall of coal,		1							1
	1	5		1	3			2	12
Two ribs broken by a fall of clod while he was loading a car,		1							1
Injured by a fall of coal while he and the miner were barring down the same,		1							1
Leg broken by a fall of coal of the pillar,		1							1
Foot badly mashed by pony rolls on breaker,								1	1
Arm and two fingers and otherwise injured by a fall of roof,		1							1
Injured by falling on the stress truck, caused by a plank breaking,								1	1
Leg broken by a fall of coal while barring down the same,		1							1
Hand badly mashed; jammed between car and center prop,					1				1
		5			1			2	8
Aggregate,	1	45	2	3	15	2	7	18	93

Recapitulation.

	1880.	1879.
Explosions of CH4 gas,	1	8
Falls of coal roof and sides,	45	44
Explosions of blasting powder,	2	2
Premature blasts,	3	
By mine cars,	15	15
In slopes,	2	5
Miscellaneous—underground,	7	12
Miscellaneous—above ground,	18	14
Totals,	93	100

TABLE III.—*Exhibits the number of collieries in operation, number of em*
the year ending

NAME AND NUMBER OF COLLIERY.	Number of breakers or collieries.	Days in operation.	NUMBER OF EMPLOYEES INSIDE.										
			Mine bosses.	Engineers and pumpmen.	Miners.	Miners' laborers.	Men, timbering.	Road and repairmen.	Men at top and bottom of slopes and planes.	Drivers and car runners.	Oilers and door-boys.	Men employed at other work, if any.	Total inside.
Green Mountain Basin :													
1 Upper Lehigh, No. 2,	1	203	1	3	73	59	. .	6	9	30	2	. .	183
2 Upper Lehigh, No. 4,	1	201	1	1	52	66	. .	2	5	14	2	. .	143
3 Pond Creek,	1	135	1	1	38	12	. .	2	2	5	2	. .	63
Total in Green Moutain Basin,	3	539	3	5	163	137	. .	10	16	19	6		389
Little Black Creek Basin :													
4 Sandy Run, No. 1,	1	209.6	1	2	54	37		3	7	27	2	.	133
5 Highland, No. 1,	1	179.5	1	5	78	23		4	13	8	4		136
6 Highland, No. 2,	1	186.5	1	6	86	10		4	5	12	3		127
7 Cross Creek, No. 1,	1	212½	1	4	84	63	18	12	10	21	2	12	230
8 Cross Creek, No. 2,	1	214	2	2	78	58	22	8	4	25	3	7	209
9 Cross Creek, No. 3,	1	186½	1		18	4	2	3	4	6	1	10	49
10 Latimer, No. 1,	1	178.7	1	3	65	9	1	2	2	9	2	4	98
11 Latimer, No. 2,	1	175.7	1	2	57	11	1	2	2	6	3	3	88
12 Milnesville, No. 6,	1	101.7	.	4	.	4	. .	1	7	1	1		18
13 Milnesvills, No. 7,	1	179	1	4	52	15	4	1	46	12	9		144
14 Hollywood, No. 1,	1	179	1	. .	27	14		1	8	14	1	11	77
Total in Black Creek Basin,	11	2002.7	11	32	599	218	48	41	108	144	31	47	1,309
Big Black Creek Basin :													
15 Buck Mountain, No. 1,	1	172.7	4	3	87	40	3	6	5	16	3	21	191
16 Council Ridge, No. 2,	1	217	1	6	72	33		6	3	10	7	4	142
17 Council Ridge, No. 5,	1	195	1	4	46	26	. .	4	3	6	3	2	95
18 Oakdale, No. 1,	1	178.7	1	2	96	16	. .	4	8	16	6	. .	149
19 Oakdale, No. 2,	1	175.5	1	2	68	11		4	6	14	2	.	108
20 Ebervale, No 2,	1	164	1	5	92	9	3	3	10	22	1	.	146
21 Ebervale, No. 3,	1	162	1	2	81	17		2	6	11	1	.	124
22 Harleigh, No. 1,	2	174.5	1	2	49	31		3	4	8	1	.	99
23 Black Ridge, (Conyngham,) No. 1,*	1		1	3	10	16	.		4		. .	.	34
24 Lower Cross Creek, (Derringer,)*		.	1	2	6	12	.	.	1		. .	.	22
25 Middle Cross Creek, (Tombickon,)*	. .		1	2	3	6		1	4	2	. .	. .	19
26 West Cross Creek, (Gowen,)*	1	. .	1	4	25	63		2	4	2	3		104
Total in Big Black Creek Basin,	11	1439.4	15	37	638	280	6	35	58	107	27	30	1,233
Hazleton Basin :													
27 East Sugar Loaf, No. 2,	1	30	1	3	43	18	2	2	3	8	3		83
28 East Sugar Loaf, No. 5,	1	201	1	7	37	7	. .	6	14	18	3	55	148
29 East Sugar Loaf, No. 7,	1	201	1	4	40	22		3	9	14	3	7	103
30 South Sugar Loaf, No. 3,	1	153	1		21	2	. .	2	1	4	3		31
31 Sugar Loaf, No. 2,	1	174	1	.	46	15	. .	5	4	7	3		81
32 Laurel Hill, No. 5,	1	197	2	. .	64	32	. .	5	5	14	4	19	145
33 Hazleton Mines, No. 1,	1	174.3	1	. .	51	19		2	5	9	2		89
34 Hazleton, No. 6,	1	191.2	1	.	69	24		3	1	8	1	.	107
35 Hazleton, No. 3, †	1		1	.	7	16		2	4				30
36 Crystal Ridge, No. 4,	1	86.7	1		25	7		2	1	8	1	.	45
37 Cranberry, No. 1,	1	193.9	1	. .	77	33		3	2	13	3	12	144
38 Mount Pleasant, No. 2,	1	183.7	2	2	64	41	2	6	7	15	4	4	147
39 Humboldt,	1	189	1	.	36	18	.	6	4	10	1		76
Total in Hazleton Basin,	12	1980.8	15	16	580	254	4	47	60	128	31	97	1,232

ployés, tons of coal marketed, number of kegs of powder used, &c., during December 31, 1880.

NUMBER OF EMPLOYEES OUTSIDE.																
Breakers and screen bosses.	Machinists.	Hoisting and pumping engineers.	Firemen.	Carpenters and blacksmiths.	Breaker men in all capacities.	Teamsters, choppers, stable bosses, &c., employed about the colliery.	Drivers.	Slate pickers.	Total outside.	Aggregate number of employees.	Number of kegs of powder used during the year.	Number of mules inside.	Number of mules outside.	Coal marketed—tons of 2,240.	Name of vein worked.	Number.
4	3	3	5	7	29	10	2	33	96	279	2,768	43	3	168,764	B, ...	1
4		4	3	4	29		3	35	82	225	3,037	20	5	138,268	B, ...	2
2	1	1	2	3	10	2	1	15	37	100	709	5	4	23,412	B, ...	3
10	4	8	10	14	68	12	6	83	215	604	6,514	68	12	330,414		
3	1	2	2	6	44	11	1	25	95	228	2,571	30	14	117,920	B, ...	4
2		1	2	3	29	. .	2	36	75	211	1,829	37	2	82,518	B, ...	5
2		1	2	3	22	. . .	2	45	77	204	2,078	30	2	83,044	B, ...	6
3	7	2	3	18	37		2	96	168	398	3,750	21	10	161,056	B, ...	7
2	41	4	3	10	13	35	1	74	183	392	3,318	21	2	190,851	B, ...	8
2		6	2	2	2		1	90	105	154	799	9	1	44,928	B, ...	9
2	. .	1	2	3	13	4	. .	61	86	184	3,000	22	8	118,716	E, ...	10
2	.	1	2	3	13	. .		68	89	177	1,788	13	8	100,032	E, ...	11
2	1	1	1	3	27	2	2	6	45	63	32	1	2	15,610	E, ...	12
2	1	1	2	7	22	‡30	3	21	94	238	839	10	5	80,333	E, . . .	13
3	.	4	2	4	15	3 ‡72 5	4	46	72 83	72 160	1,054	14	22	94,500	E, ...	14
25	51	24	33	62	237	162	20	568	1,172	2,481	21,058	208	66	1,089,508		
2	1	11	3	11	45	7	5	23	108	299	2,500	27	38	114,193	B, ...	15
3	1	1	2	7	20	2	2	40	78	220	3,267	36	8	122,095	B, . . .	16
2	.	1	2	5	12	. . .		33	55	150	1,256	7	2	58,932	B, ...	17
2		1	2	4	17	. .	2	38	67	210	1,604	19	3	87,781	E, . . .	18
2	1	1	3	5	28		2	32	74	182	1,646	33	2	83,145	E, . . .	19
4	2	3	7	9	54	3	3	21	106	252	1,389	32	6	120,727	E, . . .	20
4		3	2	5	51	2	4	17	88	212	1,290	20	6	89,498	E,	21
3		2	4	5	20	5	3	40	82	181	1,603	8	12	54,286	D and E, .	22
. .	1	3	.	21	8	4		.	37	71	. . . . .	.	.	. . . . . .	. . . .	23
.		2	2	1	. . . . .	. .		.	5	27	. . . .	. .	.	. . . . .	. . . .	24
. .		2		1	. . . . .			. .	3	22	. . . .	.		. . . . . .	E, ...	25
. .		2	2	15	. . .	18	3	.	40	144		2	10	. .	B, ...	26
22	6	32	29	89	255	41	24	245	743	1,976	14,555	184	87	730,657		
2		2	4	2	21	2	2	25	60	143	. .	8	4	6,000	E, ...	27
3		2	5	4	38	. .	2	35	89	237	1,539	29	7	93,790	E, ...	28
2	.	2	4	3	15	. . .	2	17	45	148	1,373	15	2	82,210	E, .	29
2	.	3	2	3	14	. .	1	16	41	75	498	8	2	66,996	D and E, .	30
2		7	2	3	16	1	1	20	52	133	1,142	11	4	. .	D and E, .	31
3	6	11	3	6	30	. .	7	62	128	273	1,558	40	10	.	D and E, .	32
3	. .	2	3	3	23	. . .	5	35	74	163	996	20	6	308,257	D and E, .	33
3	. .	1	4	4	20	. .	1	29	59	168	2,423	14	2	. . . . .	E, .	34
1		3	2	3	6		2	.	17	47	5		4	. . .	E, ...	35
2	. .	6	2	3	13	. .	.	18	44	89	353	11	1	127,969	E, . .	36
3		4	2	4	19	2	. .	31	65	209	2,141	22	3	. .	D and E, .	37
1		4	6	5	39	7	.	31	93	240	1,726	26	12	94,257	D and E, .	38
2	. .	3	3	3	12	4	2	22	51	127	1,694	11	6	70,000	D, . . .	39
29	6	59	39	46	266	16	25	341	818	2,050	15,448	215	63	849,479		

TABLE III.—

NAME AND NUMBER OF COLLIERY.	Number of breakers or collieries	Days in operation.	NUMBER OF EMPLOYEES INSIDE.										
			Mine bosses.	Engineers and pumpmen.	Miners.	Miners' laborers.	Men, timbering.	Road and repairmen.	Men at top and bottom of slopes and planes	Drivers and car runners.	Oilers and door-boys.	Men employed at other work, if any.	Total inside.
Beaver Meadow Basin :													
40 Stafford, No. 1, †	1	. .	. .		. . .	. .						. .	. .
41 Colerain, No. 1,	1	. .	1	2	22	21	4	4	3	6	2	.	65
42 Colerain, No. 2,	1		2	2	28	29	2	3	1	16	3	2	87
43 Spring Mountain, No. 1,	1	189	1	.	40	40		2	2	25	4	5	123
44 Spring Mountain, No. 4, †	1	.	1		. . .		. .		. .				1
45 Spring Mountain, No. 5,	1	191	2	1	73	57	. .	2	7	28	5	11	186
46 Beaver Brook, No. 1,	1	191	1	2	18	17		2	5	8	3	7	57
47 Beaver Brook, No. 2.	1			2	11	11	.	1	2	3			30
48 Spring Brook, (Yorktown,) No. 5,	1	189.5	2	3	43	27		6	8	15	2	7	113
49 Spring Brook, (Yorktown,) No. 6,	1	184	1	1	48	36	2	4	0	15	2		118
50 Tresckow, No. 6,	1	169.6	1	2	64	39	3	4	5	18	8	4	148
Total in Beaver Meadow Basin,	11	1114 1	11	15	351	277	11	28	42	134	29	30	928
Mauch Chunk and Tamaqua Basin :													
51 Room Run, No. 3.	1	176	3	13	70	28	26	6	6	20	17	15	204
52 Panther Creek, (idle,) No. 4, †	1		1	6	. . .			136		3	6	.	152
53 Panther Creek, No. 5,	1	180	1	4	34	36	25	4	9	23	8		144
54 Panther Creek, No. 6.	1	176	1	2	71	41	4	4	4	12	5	.	147
55 Panther Creek, No. 9,	1	195	1	3	74	75	30	43	12	33	21		292
56 Hackleberney Tunnel,					4	2							6
57 Panther Creek, No. 6, West Mt. Tunnel,		.		1	20	18				5			44
58 Panther Creek, No. 6, East Mt. Tunnel,		.	1		21	7			.	4			33
59 Panther Creek No. 8, Mt. Tunnel,					20	8				3	.		31
Screen building, (Nesq. Valley,)		. . .				.			.				
Total in M. Chunk and Tamaqua Basin,	5	727	8	29	314	218	85	93	31	103	57	15	1,053
Grand totals,	51	7,803	63	134	2,645	1,414	154	354	315	665	181	219	6,144

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* New collieries, opening out work, sinking slope, &c.

† Not in operation during 1880.

‡ Men employed at stripping coal.

‖ Estimated.

Coniinued.

NUMBER OF EMPLOYEES OUTSIDE.																
Breakers and screen bosses.	Machinists.	Hoisting and pumping engineers.	Firemen	Carpenters and blacksmiths	Breaker men in all capacities.	Teamsters, choppers, stable bosses, &c., employed about colliery.	Drivers.	Slate pickers.	Total outside.	Aggregate number of employees.	Number of kegs of powder used during the year.	Number of mules inside.	Number of mules outside.	Coal marketed - tons of 2,240.	Name of vein worked.	Number.
. .		.	.		.				. .	. .	. . . .		.	. . . . .	D and E, .	40
1	1	3		2	7	1	3	40	58	123	750	9	5	140,000	D and E, .	41
4	. .	3	6	7	15	1	7		43	130	725	14	15	.	D and E, .	42
4	. .	3	4	3	23	3	1	38	79	2(2	. .	25	2	80,000	D and E, .	43
. .	. .	2	2		2	.	. .	. . .	6	7		2	2	. .	D and E, .	44
4	. .	5	5	5	25	5	2	36	87	273	3,700	32	8	98,000	D and E, .	45
1		3	5	4	10	3	4	30	60	117	1,425	16	9	66,000	D and E, .	46
. .	.	1	3		. . .	. .		.	4	34		4		. .	D and E, .	47
5	1	3	6	6	4	1	4	27	57	170	2,965	12	2	141,409	D and E, .	48
3		2	4	5	3	1	4	28	50	168		11	5	.	D, ...	49
3	.	5	4	5	23	*12 2	2	59	115	263	2,086	27	11	1'0,003	D and E, .	50
25	2	30	39	37	112	29	27	258	559	1,487	11,651	152	59	635,412		
5	3	2	2	7	49	10	5	36	119	323	1,480	30	20	1(2,867	E and G, .	51
. .	. .	. .	5	. .	. .	. .	.	.	5	156	. . . .	10	.	. .	E, ...	52
4	. .	2	5	4	34	4	4	46	103	247	780	27	10	71,272	E, . . .	53
4	.	2	1	4	26	4	9	49	99	246	540	12	11	68.811	E and —, .	54
5	.	2	7	6	40	4	13	97	174	466	660	52	15	101,087	E, . .	55
.	. .		. .	. .	3	. . .	. .	. .	3	11	25	.		‖ 800	E and G, .	56
. .	.	. .	. .	. .	. . . .	.	. .	. .	. . . .	44	100	8	. .	. . . . . .	E, ...	57
. .	. .	.	. .	. .	. . . .	. .	. .	. . .	. . . .	33	66	8	. .	. . . .	E, ...	58
. .		. .	. .	. .	. . .	. .	. .	. .	. .	30	60	5	.	. . . . . .	E, ...	59
3	3	2	3	.	41	. . .	1	48	101	101	.		2			
21	6	10	23	21	193	22	32	276	604	1,657	3,711	152	58	344,837		
132	75	154	163	269	1,131	282	134	1,171	4,111	10,255	72,937	979	345	3,980,337		

It will be observed that this table is made by commencing to enumerate the collieries that are located in the Green Moutain basin first, the most northerly in the district, and tabulating them in their successive order southward, beginning each time to enumerate at the eastern end of the basin, and counting westward. This is done with the view of keeping the coal produced from each basin separately. E, Mammoth vein ; D, Wharton vein ; G, Primrose vein.

TABLE NO. IV.—*Shows the loss of life by colliery accidents, under separate heads, from 1871 to 1880, inclusive, in the South district.*

	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	Total.	Per cent.
Explosions of carbureted hydrogen gas,	....	1	1	2	2	4	....	2	2	..	14	4.86
Falls of roof and sides:												
Falls of coal,	10	13	17	6	8	13	11	8	12	8	106	36.81
Falls of roof,	....	....	...	..	...	...	..	5	3	2	10	3.47
Falls of rock and slate,	1	2	4	5	3	5	6	2	....	2	30	10.42
Total by falls,	11	15	21	11	11	18	17	15	15	12	146	50.70
In shafts and slopes:												
Falling into slopes,	1	....	1	....	....	2	..	..	.	.	4	1.33
Hoisting machinery breaking, ropes, &c.,	.	....	....	4	1	1	...	2	2	1	11	3.82
Sundries in slopes,	3	1	1	...	....	....	...	.	...	2	7	2.43
Total in slopes.	4	1	2	4	1	3	..	2	2	3	22	7.63
By mine cars in gangways:												
By mine cars,	5	3	2	6	..	7	6	2	2	6	39	13.54
Miscellaneous under ground:												
By explosions of blasting powder,	2	1	...	...	...	1	.	.	...	....	4	1.39
By mules,	....	...	1	...	....	...	..	.	...	....	1	.35
By premature blasts,	2	4	2	.	...	.	...	3	...	2	13	4.52
By sundries,	1	...	2	5	5	1	.	.	...	....	14	4.86
Total miscellaneous under ground,	5	5	5	5	5	2	.	3	.	2	32	11.12
Total under ground,	25	25	31	28	19	31	23	24	21	23	253	87.85
Above ground:												
By machinery,	..	1	1	...	1	2	1	1	3	1	11	3.82
By suffocation in breaker chutes,	2	..	....	....	....	..	...	..	..	1	3	1.04
By mine cars,	2	1	3	..	1	...	.	2	1	....	10	3.47
By sundries,	....	....	1	3	...	1	2	3	..	1	11	3.82
Total above ground,	4	2	5	3	2	3	3	6	4	3	35	12.15
Gross total,	29	25	38	31	21	37	26	30	25	26	288	100.

The whole number of fatal colliery accidents, as shown in this table, during the year just ended, were twenty-six, equivalent to nearly ten per cent. less than the average for the past ten years, or about three and a half per cent. less than the greatest fatality record since 1873, and twenty-three and eight tenths per cent. in excess of the lowest death rate, which were twenty-one in 1875; but as the mines only worked about half time during that year, the death tonnage of coal was only 121,709 tons for each life lost, compared with 165,337 tons in 1880.

The percentage of casualties do not vary much from that given in my report of 1879. Still, there is a slight variation, which is to be expected; for instance, the decrease by falls of coal and fire damp have been about one per cent. each, while those occurring by mine cars has increased that much.

TABLE NO. V.—*Showing the number of employés working in and about the mines, and their ages, respectively.*

	NUMBER OF EMPLOYEES WORKING—																						
	OUTSIDE.											Total.	INSIDE.									Total.	Grand total.
Ages, years,	8 to 10	10 to 12	12 to 13	13 to 16	16 to 21	21 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80		12 to 13	13 to 16	16 to 21	21 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80		
Number, . .	50	381	431	601	530	623	475	483	339	171	17	4,111	32	263	1,048	2,019	1,466	919	349	47	4	6,144	10,255

This table is intended to show how young and old the men and boys working in this district are, as near as can be ascertained from the bosses by whom they are employed. It will be observed that there are 4,111 persons employed outside, and 6,144 inside, making a gross total of 10,255 persons engaged in the various occupations about the collieries.

Outside, at the breakers, there are fifty boys working at picking slate, whose ages range from eight to ten years, and in the mines there are thirty-two working at tending ventilating doors, &c., whose ages run from twelve to thirteen years.

As regards old men, seventeen are employed outside, and four inside, whose ages are from seventy to eighty years. The former are generally put to pick slate on the breakers, and the latter at cleaning roads, gutters, &c., in the mines.

TABLE NO. VI.—*Shows the performance of work done and the comparative*

COLLIERIES.	BY WHOM OPERATED	Number of locomotives.		DIMENSIONS OF LOCOMOTIVES.							
		Inside.	Outside.	Steam pressure per sq. inch pounds.	Storke—inches.	Cylinder—inches.	Driving wheels—inches.	Weight—inches.	Estimated horse power.	Cars hauled per trip	Weight of load—tons.
1 Ebervale, No. 2, . .	Ebervale Coal Co., .	1	. . .	130	14	9½	27½	9	27	10	37½
2 Rom Run, No. 3,	L. C. & Nav. Co., .	1	. .	110	16	9	27	10	32	12	48
3 Rom Run, No. 2, . .	L. C. & Nav. Co., . .	1		110	10	6½	30	4	16	10	40
4 Panther Creek, No. 9,	L. C. & Nav. Co., .	1	1	110	12	9	30	8	32	25	100½
5 Panther Creek, No. 6,	L. C. & Nav. Co., . .	1	. .	85	12	7	28	5	18	12	48
6 Panther Creek, No. 5,	L. C. & Nav. Co., .	1	.	100	12	9	30	8	32	25	100½
7 Oak Dale, No. 1,	G. B. Markle & Co., .	1	. . .	120	14	9	28	7	24	14	55
8 Oak Dale, No. 1, . .	G. B. Markle & Co., .	1	. .	90	14	9½	28	9	27	10	34
9 Laurel Hill, .	A. Pardee & Co., . . .	1	. . .	100	14	8	28	5¾	18	13	50
10 Lattimer, No. 2,	Pardee Bros. & Co., .	1	. .	120	14	9½	30	8	25	3	50
11 Mount Pleasant, . .	Pardee & Sons,	.	1	100	14	9½	28½	7	20	10	30
12 Upper Lehigh, . . .	Upper Lehigh Coal Co.	. . .	1	90	14	9½	30	8	25	10	32¼
13 Cross Creek, No. 1, .	Cox Bros. & Co.,	1	. . .	120	14	10	28	7	25	7	33
14 Cross Creek, No. 2, .	Cox Bros. & Co., .	1		110	14	10	28	7	25	8	38
15 Coleraine, .	W. T. Carter & Co.,	.	1	110	14	9	30	9	30	6	22
16 Tresckow, No. 6, . .	E. B. Leisenring, . . .	. . .	1	100	12	8	30	7	30	10	35
17 Stout, (Milnesville,)	Stout Coal Co.,	. .	1	120	10	8	30	7	30	12	36
18 Beaver Brook, . .	C. M. Dodson & Co., .	.	1	80	12	7	20	5	20	5	20
19 Humboldt, ...	Lindermen, Skeer & Co	. .	1	65	13	9½	28½	8	32	10	31
Averages, ...	. . . .	12	8	103.7	13.1	8.76	28.37	7.3	25.68	11.63	44.25

Reference.

Where there are two locomotives used, one inside and the other outside, only that of the inside one is taken into account. Hence, the averages have been obtained by dividing by nineteen. It will be observed that the average difference, in first cost, of mules and locomotive is $852 90, and the mean difference in favor of the latter is $5 97 per day. This, divided into the difference in first cost, gives 143 days, or about 4.8 months, that the locomotive would pay for itself, (interest, of course, being discarded in both cases.) Showing a saving of about 130 per cent. by locomotive haulage.

It will also be noticed, in the table, that the expenses of mule power, at some of the collieries, greatly exceeds that of others, which is to be expected, as the condition of things vary so much at each place; for instance, that twelve mules were necessary to do the same amount of work in the same time as that of a locomotive, it would require, under very favorable circumstances, three teamsters to drive those mules, by putting them in four-mule teams, and in many cases it would require double that number, augmenting the expenses so much as 300 per cent. in favor of the locomotive.

To use the mine locomotive for underground haulage, the following conditions should be taken into consideration: (1.) Adequate ventilation. (2.) Ventilation produced by mechanical appliances, that by fan preferable. (3.) Velocity of the air current should be from eight to twelve feet per second, and not less than six feet. The mean speed of the locomotive is about seven feet a second, which is a trifle less than the former velocity, of the air current, advocated. (4.) The size of gangways and tunnels, where locomotive travels, should not be less than seven feet high by ten feet wide; although there are some running, at a few collieries, in places not more than seven feet by eight feet. Of course, the more room the better. (5.) The locomotive track should be kept in good condition, which is not a very easy matter to do in mines that are very wet, as the water from the chutes and ditch gets under the railroad ties, causing the joints of the T rails to become sagged (6.) The engine run should be from tunnel mouth, bottom of shaft, or foot of slope, as the case might be to inside tunnel or siding; at any rate, men ought not to be permitted to work on the route that the locomotive travels, owing to the noxious gases emitted.

The horse power of the locomotive is not absolutely correct, and can only be taken as estimates. The rest of the data are reliable, as they were obtained from the company's officials.

Accidents to mine locomotive hands, in this district, are comparatively few. The only case resulting in death, that has occurred, was an engineer at Ebervale colliery, who was fatally injured by a car jumping the track, knocking out a couple of sets of gangway timbers, which fell on the engineer when reversing his engine, while those to mule drivers have been six this year. Of course, there is a limit to *cost of haulage, by mine locomotive and that of mule power, &c.*

Distance traveled in round trip—miles.	Time taken to run round trip—miles.	Rate of speed in miles per hour.	Grade—degrees.	COST OF RUNNING LOCOMOTIVE PER DAY				COST OF HAULAGE BY MULES PER DAY.				Difference in cost per day, in favor of mine locomotives.	VALUATION OF		Number.
				Engineer and fireman.	Packing, oil, coal, &c.	Repairs.	Total.	Number to do the same amount of work in the same time.	Feed, harness, shoeing, attendance, &c.	Drivers.	Total.		Locomotive.	Mules.	
0.530	6	5.300	1 to 3	$4 25	$0 50	$0 60	$5 35	15	$9 00	$7 00	$16 00	$10 65	$3,000	$2,625	1
1.708	18	5.693	1 to 4	3 48	50	25	4 23	12	4 80	3 01	7 81	3 57	4,000	1,920	2
1.250	32	2.344	1 to 3	3 48	48	35	4 31	6	2 40	3 07	5 47	1 16	3,000	960	3
0.833	13	3.845	1 to 2	3 65	82	25	4 72	12	3 24	4 00	7 24	2 52	3,000	1,920	4
1.478	24	3.695	1 to 3½	3 65	82	30	4 77	12	3 24	4 00	7 24	2 47	2,500	1,920	5
2.242	28	4.804	1 to 3½	3 65	82	1 60	6 07	18	4 86	6 00	10 86	4 79	3,000	2,880	6
4.091	50	4.908	1 to 3	3 50	75	26	4 51	18	5 40	5 25	10 65	6 14	2,700	3,200	7
0.544	10	3.264	1 to 3	3 50	75	26	4 51	10	3 00	3 00	6 00	1 49	3,000	2,000	8
2.272	23	5.927	1 to 2	2 72	86	1 76	5 34	16	4 96	6 84	11 84	6 50	3,800	3,200	9
1.307	13	6.033	1 to 3	2 58	1 50	1 00	5 08	25	11 15	8 35	19 50	14 42	2,900	5,000	10
1.137	20	3.411	1 to 2	1 98	1 06		3 04	8	2 48	2 40	4 88	1 84	3,200	1,600	11
1.328	15	5.312	1 to 3½	1 80	1 00	05	2 85	16	4 80	2 30	7 10	4 25	3,500	1,000	12
1.054	20	3 162	*1 to 4	3 94	2 00	1 70	7 64	16	16 00	12 88	28 88	21 24	3,000	2,889	13
1.440	20	4.320	1 to 5	2 91	2 00	62	5 53	12	12 00	9 65	21 65	16 12	3,000	2,190	14
1.477	15	5.968	1 to 6	3 00	75	15	3 90	8	3 04	5 00	8 04	4 14	3,000	1,000	15
0.981	10	5.886	1 to 5	2 75	50	12	3 75	6	2 10	5 00	7 10	3 35	3,500	1,200	16
1.136	10	6.816	1 to 5	2 75	25	10	3 10	6	1 75	2 40	4 15	1 05	2,300	900	17
1.710	20	5.630	*1 to 4	2 55	1 25	25	4 05	8	3 20	3 00	5 20	1 15	2,000	1,800	18
1.510	8	11.325	1 to 3	2 61	75	25	3 61	16	4 50	5 60	10 10	6 49	2,800	2,800	19
1.475	18.68	5.136	1 to 3½	$3 09	$0 92	$0 52	$4 54	12	$5 36	$5 21	$10 51	$5 97	3,010.53	2,157.63	

* Engine hauls loaded trip up grade. † Only an engineer required.

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the use of the mine locomotive for underground haulage, and I cannot advocate or permit its use further than that of hauling the coal from the inside turnout to the bottom of the slope or along a portion of the gangway where the breasts are finished.

Wherever the locomotive is used, in this district, the inlet for the air current is inside of the terminus of the locomotive run.

TABLE NO. VII.—*Statistics pertaining to slopes, hoisting, dimensions of hoisting*
sions of steam

Number.	NAME OF COLLIERY.	BY WHOM OPERATED.	Slope No.	Number of slopes.	Length of slopes in feet.	Length of plane from mouth of slope to top of breaker.	Total distance hoisted, from bottom of slope to top of breaker.	Maximum and minimum dip of slopes—degrees.	Average number cars hoisted per day, of ten hours.	Equivalent in tons of coal hoisted per day, of ten hours.	Speed of car on slope, in feet, a second.
1	Upper Lehigh, ...	Upper Lehigh Coal Co.	1	1	248	228	476	19 to 28	115	210	5 6
2	Upper Lehigh, ...	Upper Lehigh Coal Co.	2	2	424	174	598	40 to 36	295	622	10
3	Upper Lehigh, ...	Upper Lehigh Coal Co.	4	3	1,055	273	1,328	23 to 5	330	688	11 3
4	Upper Lehigh, ...	Upper Lehigh Coal Co.	5	4	297	. . .	. . .	17 to 9	. . .	. . .	. . .
5	Pond Creek, ...	Pond Creek Coal Co., .	1	5	180	75	255	48 to 30	88	172	10
6	Sandy Run, ...	M. S. Kemmerer & Co.,	2	6	370	116	486	43 to 55	250	535	4
7	Highland, ...	G. B. Markle & Co., .	1	7	684	138	822	28 to 35	200	450	8
8	Highland, ...	G. B. Markle & Co., .	2	8	360	141	504	33	160	440	7
9	Cross Creek, No. 1, .	Coxe Bros. & Co., . . .	1	9	891 345	176	. . .	18 to 12 32 to 12	350	821	13
10	Cross Creek, No. 2, .	Coxe Bros. & Co., . . .	2	10	126 1,045	176 176	202 1,221	36 9 to 62	386	912	8 16
11	Cross Creek, No. 3, .	Coxe Bros. & Co., . .	3	11	235	140	375	45 to 32	125	256	5
12	Cross Creek, No. 4, .	Coxe Bros. & Co., . . .	4	12	350	. . .	. . .	32 to 6	. . .	. . .	11
13	Latimer, ...	Pardee Bros. & Co., .	1	13	377	318	725	65 to 35	250	664	9
14	Latimer, ...	Pardee Bros. & Co., .	2	14	382	314	696	45 to 70	220	567	8
15	Stout, (Milnesville,) .	Stout Coal Company, .	5	15	390	. . .	390	30 to 40	40	80	5
16	Stout, (Milnesville,) .	Stout Coal Company, .	7	16	570	40	610	40 to 60	200	400	10
17	Stout, (Milnesville,) .	Stout Coal Company, .	6	17	294	150	444	30 to 40	150	200	5
18	Hollywood, ...	Calvin Pardee & Co., .	2	18	240	. . .	240	40 to 70	250	500	12
19	Hollywood, ...	Calvin Pardee & Co., .	1	19	297	138	435	40 to 60	100	200	5
20	Buck Mountain, . . .	Buck Mountain C. Co.,	1	20	300	. . .	300	15	411	643	2¼
21	Buck Mountain, . . .	Buck Mountain C. Co.,	3	21	300	. . .	300	20			4
22	Buck Mountain, . . .	Buck Mountain C. Co.,	4	22	300	. . .	300	30			2
23	Buck Mountain, . . .	Buck Mountain C. Co.,	7	23	290	. . .	290	31			11⅛
24	Council Ridge, ...	J. Leisenring & Co., .	2	24	500	150	650	28 to 35	270	562	6
25	Council Ridge, ...	J. Leisenring & Co., .	5	25	430	150	580	45	140	307	5
26	Oak Dale, ...	G. B. Markle & Co., .	1	26	612	142	754	30 to 40	200	450	5
27	Oak Dale, ...	G. B. Markle & Co.. .	2	27	861	131	992	33 to 40	160	440	6
28	Ebervale, ...	Ebervale Coal Co., . .	1	28	810	. . .	810	28 to 38	150	300	7
29	Ebervale, ...	Ebervale Coal Co., . .	2	29	690	150	840	28 to 40	250	500	7
30	Ebervale, ...	Ebervale Coal Co., . .	3	30	825	150	975	28 to 40	250	500	7
31	Ebervale, ...	Ebervale Coal Co., . .	5	31	339	. .	. . .	27 to 35	120	240	4
32	Ebervale, ...	Ebervale Coal Co., . .	6	32	220	. . .	. . .	30 to 38	150	300	4
33	Harleigh, ...	McNair & Co., ...	1	33	500	200	700	25 to 30	66	108	6
34	Harleigh, ...	McNair & Co., ...	4	34	336	. . .	336	40 to 45	153	254	4
35	Black Ridge, ...	Black Ridge Coal Co. .	1	35	300	164	464	40 to 50	. . .	. . .	. .
36	Middle Cross Creek, .	Coxe Bros. & Co., . . .	1	36	177 460	. . .	. . .	40 to 12 21 to 4	. . .	. . .	. . .
37	Lower Cross Creek, .	Coxe Bros. & Co., . . .	1	37	386	. . .	. .	15 to 80	. . .	. . .	. . .
38	West Cross Creek, . .	Coxe Bros. & Co., . .	1	38	258	. . .	258	9½ to 20	. . .	. . .	4
39	East Sugar Loaf, . . .	Linderman, Keer & Co.	2	39	1,450	104	1,554	26 to 47	100	200	7
40	East Sugar Loaf, . . .	Linderman, Keer & Co.	4	40	300	. .	300	27 to 34	60	130	5
41	East Sugar Loaf, . . .	Linderman, Keer & Co.	5	41	650	160	810	45 to 20	180	390	6
42	East Sugar Loaf, . . .	Linderman, Keer & Co.	7	42	540	90	630	25 to 37	220	435	6
43	Sugar Loaf, ...	A. Pardee & Co., . . .	2	43	1,442	. .	1,442	28 to 45	250	575	14
44	South Sugar Loaf, . .	A. Pardee & Co., . . .	3	44	640	63	703	25 to 47	250	575	10
45	Laurel Hill, ...	A. Pardee & Co., . . .	4	45	150 397	143	293 540	69 35 to 62	120 200	247 562	5 7
46	Hazleton, No. 3, . . .	A. Pardee & Co., . . .	3	46	1,000	. .	. .	27 to 45	. . .	. . .	. . .
47	Hazleton, No. 6, . . .	A. Pardee & Co., . . .	6	47	442	205	647	6 to 29	225	633	11
48	Hazleton mines, . . .	A. Pardee & Co., . . .	1	48	1,879	. .	1,879	6 to 35	200	412	10 7
49	Crystal Ridge, ...	A. Pardee & Co., . . .	4	49	971	150	971	10 to 70	200	412	9
50	Cranberry, ...	A. Pardee & Co., . . .	1	50	905	170	1,075	10 to 27	300	6.9	15 4
51	Cranberry, ...	A. Pardee & Co., . . .	2	51	280	.	280	20	100	200	4
52	Mount Pleasant, . .	Pardee, Sons & Co., .	1	52	258	288	546	43 to 34	150	250	9

engines and wire ropes, also lineal speed of car in slope, in feet, per second, dimen-
boilers, &c.

Dimensions of wire rope in use.					Dimensions of hoisting engines and their motions.					No. and dimensions of cylindrical steam boilers.					
Total number of ft. of wire rope in use.	Diameter of rope—inches.	Wire or hemp core.	Diameter of drum—feet.	Average duration or life time of wire rope, in years.	Length of stroke—inches.	Diameter of cylinder—inches.	Speed of engines in ft. per min. when hoisting load.	Direct or second motion.	Pressure per square inch on steam boilers.	Number.	Lengths—feet.	Diameters—inches.	Date of first shipments of coal from this colliery.	Condition of wire rope and hoisting tackle.	Number.
1,100	1⅜	H.,	6 8	2	30	15	250	S.,	75	4, 4	26.36	34	Mar., 1867	Good, . . .	1
4,300	1⅜	H.,	10 5	1½	30	16	292	S.,	75	16, 4	26, 36	34	Mar., 1867	do. . . .	2
3,750	1¼	H.,	9 6	1¼	30	18	495	S.,	75	16	36	34	July, 1875	do. . . .	3
400	¾	H.,	4 6	. . .	18	8	. . .	S.,	75	1	12	48	Sinking S.,	do. . . .	4
375	1¼	H.,	8 10	1½	¶36	18	467	S.,	60	4	38	34	April, 1880	do. . . .	5
2,000	1½	H.,	12	1½	30	18	225	S.,	75	10	36	34	July, 1877	do. . . .	6
*670	1¼	W.,	8 6	1½	30	18	300	S.,	60	15	23	33	May, 1867	do. . . .	7
2,600															
*900	1⅜	W.,	7 6	1	24	14	300	S.,	60	15	23	33	July, 1876	do. . . .	8
1,400															
1,600	1½	H.,	8	3 to 4	30	16	300	S.,	70	18	36	34	June, 1866	do. . . .	9
700	1¼														
9 0	1½														
1,500	1½	H.,	10	3 to 4	48	18	336	S.,	70	18	36	34	July, 1878	do. . . .	10
1,200	1½				72	22	206	D.							
1,800	1½														
800	1½	H.,	10	3 to 4	¶60	16	240	S.,	70	6	36	34	1867	do. . . .	11
450	1½	H.,	6	3 to 4	24	15	240	S.,	70	3	36	34	. . . .	do. .	12
1,600	1⅜	H.,	9	1 to 6	36	18	250	S.,	75	14	22	33	1866	do. . . .	13
1,800	1⅝	H.,	6	1 to 6	26	18	250	S.,	75	12	22	33	1871	do. . . .	14
410	1¼	H.,	6	1	26	16	300	S.,	65	11	22	33	May, 18 0	do. . .	15
*240	1¼	H.,	8	½	30	16	600	S.,	65	17	22	33	1876	do. . . .	16
750															
1,000	1¼	H.,	8	3	¶48	18	300	S.,	60	11	22	33	. . . .	do. . . .	17
1,500	1⅝	H.,	16	1½	72	22	250	D.	75	8	22	30	. . . .	do. . . .	18
970	1½	H.,	8	1½	36	16	300	S.,	75	8	22	30	Aug., 1874	do. . . .	19
400	1	H.,	5	1½	30	12	363	S.,	65	4	30	34	. . . .	do. . . .	20
400	1½	H.,	8	1½	¶72	18	245	S.,	70	9	30	30	. . . .	do. . . .	21
500	1½	H.,	8	1½	¶48	14	162	S.,	55	4	31	34	1845	do. . . .	22
6,700	1¼	H.,	10	1½	30	16	362	S.,	80	6	30	34	. . . .	do. .	23
*1,100	1½	W.,	7	1	30	16	360	S.,	80	18	36	34	1855	do. . . .	24
1,800															
*1,100	1½	W.,	8	1	30	18	360	S.,	80	12	36	34	1876	do. . . .	25
1,100															
*660	1⅜	W.,	8½	1½	30	16	300	S.,	60	12	23	33	April, 1864	do. . . .	26
1,9 0															
2,200	1⅜	W.,	9	1	30	18	300	S.,	70	22	23	33	April, 1873	do. . . .	27
1,150	1¼	H.,	10	1	24	16	360	S.,	70	25	22	33	1861	do. . . .	28
*500	1¼	H.,	11	1	26	14	400	S.,	70	20	22	33	1865	do. . . .	29
2,3 0															
2,300	1¼	H.,	11	1	26	14	400	S.,	70	15	22	33	1876	do. . . .	30
†100	1¼	H.,	8	1	¶60	14	200	S.,	70	. . .	. . .	3	1880	do. . . .	31
†2,000	1¼	H.,	8	1	¶60	14	200	S.,	70	. .	. . .	. . .	1880	do. . . .	32
†800	1⅜	H.,	8	2	¶60	16	400	S.,	60	13	24	31	. . . .	do. . . .	33
*1,200	1⅜	H.,	10	1	¶60	16	300	S.,	60	8	26	33	. . . .	do. . . .	34
†400															
375	1⅛	H.,	6	. . . .	30	14	. .	S.,	70	6	30	34	1831	New col'y,	35
500	1	H.,	. . .	. . . .	36	10	120	S.,	70	2	. . .	. . .	Sinking,	Good, . . .	36
500	1¼	H.,	. . .	. . . .	36	12	270	S.,	70	2	. . .	. . .	Sinking,	do.	37
500	1¼	H.,	. .	. . . .	12	12	270	S.,	70	2	. .	. .	Mak'g imp.	do. . .	38
3,900	1½	H.,	16	1	36	18	300	S.,	70	19	36	33	1853	do. . .	39
†450	1½	H.,	9	3	¶60	18	100	S.,	70	15	36	32	1861	do. . . .	40
3,250	1½	H.,	9	¾	36	16	250	S.,	70	19	30	32	1866	do. . . .	41
2,100	1½	H.,	9	1½	¶60	18	200	S.,	70	23	22	32	1873	do. . . .	42
4,995	1⅜	H.,	10	5	30	18	300	S.,	65	27	22	30	1839	do. . . .	43
2,100	1⅝	H.,	10	2	¶48	22	300	S.,	60	16	22	33	1846	do. . . .	44
4,050	1⅝	H.,	8	2	¶31	18	400	S.,	80	32	30	33	1838	do. . . .	45
			16	¾	72	32	168	D.							
1,280	1⅝	H.,	10	2	30	16	900	S.,	65	16	36	33	. . . .	do. . . .	46
2,000	1⅝	H.,	10	3	30	18	830	S.,	75	10	36	33	1880	do. . .	47
4,100	1⅝	H.,	16	1¼	¶60	16	800	S.,	100	15	22, 30	30, 33	1838	do. . . .	48
3,000	1⅝	H.,	10	5	30	18	1,062	S.,	65	16	30	33	. . . .	do. . .	49
*1,000	1⅝	H.,	9	2	¶60	16	590	S.,	60	21	32	33	1846	do. . . .	50
3,250															
‡700	1⅝	H.,	9	2	¶60	16	250	S.,	60	2	36	33	. . . .	do.	51
1,250	1½	H.,	9	4	¶60	17	300	S.,	60	6	30	33	. . . .	do. . . .	52
305	1		4½	2											

TABLE NO. VII.—

Number.	NAME OF COLLIERY.	BY WHOM OPERATED.	Slope No.	Number of slopes.	Length of slopes in feet.	Length of plane from mouth of slope to top of breaker.	Total distance hoisted, from bottom of slope to top of breaker.	Maximum and minimum dip of slopes—degrees.	Average number cars hoisted per day, of ten hours.	Equivalent in tons of coal hoisted per day, of ten hours.	Speed of car on slope, in feet, a second.
53	Mount Pleasant, . . .	Pardee & Sons, ...	2	53	495	132	627	45 to 8	150	250	9
54	Humboldt, ...	Linderman, Keer & Co.	5	54	375	200	575	17	180	360	6
55	Stafford, ...	Idle, ...	1	55	150	. . .	150	30	75	150	5
56	Stafford, ...	Idle, ...	2	56	350	. . .	350	45	200	400	8
57	Coleraine, ...	Wm. T. Carter & Co.,	1	57	951	50	1,004	10 to 25	30	60	4½
58	Coleraine, ...	Wm. T. Carter & Co.,	2	58	540	60	600	30 to 40	90	180	6
59	Coleraine, ...	Wm. T. Carter & Co.,	4	59	450	. .	450	30 to 45	150	300	4
60	Spring Mountain, . .	J. C. Haydon & Co., .	1	60	720	160	880	25	220	450	9
61	Spring Mountain, . .	J. C. Haydon & Co., .	4	61	600	140	740	46 to 25	250	550	8
62	Spring Mountain, . .	J. C. Haydon & Co., .	5	62	700	110	800	45 to 25	250	600	8
63	Spring Mountain, . .	J. C. Haydon & Co., .	6	63	330	20	350	20	. . .	. . .	5
64	Spring Mountain, . .	J. C. Haydon & Co., .	7	64	790	40	830	45 to 10	. . .	. . .	7
65	Beaver Brook, ...	C. M. Dodson & Co., .	2	65	870	180	1,050	25 to 12	180	360	15
66	Beaver Brook, ...	C. M. Dodson & Co., .	4	66	540	. . .	540	38 to 30	30	60	10
67	Beaver Brook, ...	C. M. Dodson & Co., .	9	67	350	172	522	20 to 30	50	100	5
68	Spring Brook, ...	Geo. H. Myers & Co., .	5	68	390	94	480	45 to 62	210	390	7
69	Spring Brook, ...	Geo. H. Myers & Co., .	6	69	660	. . .	660	15 to 35	150	300	. . .
70	Tresckow, ...	E. B. Leisenring, . . .	6	70	590	240	830	26 to 15	220	350	10
71	Tresckow, ...	E. B. Leisenring, . . .	7	71	309	. . .	309	50 to 41	80	105	. . .
72	Room Run, No. 3, . .	L. C. and Nav. Co., .	3	72	500	. . .	500	35	163	320	7
73	Room Run, No. 1, . .	L. C. & Nav. Co. shaft,	1	73	310	. . .	310	90	180	360	11
74	Panther Creek, No. 4,	L. C. and Nav. Co., .	4	74	708	. . .	708	68	500	1,250	12
75	Panther Creek, No. 7,	L. C. and Nav. Co., .	7	75	272	. . .	272	70	380	875	8
76	Panther Creek, No. 6,	L. C. and Nav. Co., .	6	76	376	. . .	376	45	120	300	6
77	Panther C. No. 6 tun.,	L. C. and Nav. Co., .	6	77	. . .	. . .	. . .	. . . .	300	750	. . .
78	Panther Creek, No. 9,	L. C. and Nav. Co., .	9	78	270	. . .	270	35	350	875	8
79	Screen Building, . . .	L. C. and Nav. Co., .	. . .	. . .	. . .	. . .	. . .	. . . . . .	. . .	. . .	. . .
		Total, ...	. . .	. . .	41,957	. . .	. . .	. . . . . .	. . .	. . .	. . .

* Rope used for letting down planes and for inside slopes.

† Only single rope in use.

‖ Portion of this rope used for underground haulage.

‡ Portion of this rope is used for hoisting from the surface; hoisting to first lift, engines placed on the surface.

¶ Single Engines; the others are all double engines.

D—Direct acting; S—Second motion; H—Hemp core; W—Wire core.

Continued.

Dimensions of wire rope in use.			Diameter of drum—feet.	Average duration or life time of wire rope, in years.	Dimensions of hoisting engines and their motions.				Pressure per square inch on steam boilers.	No. and dimensions of cylindrical steam boilers.			Date of first shipments of coal from this colliery.	Condition of wire rope and hoisting tackle.	Number.
Total number of ft. of wire rope in use	Diameter of rope—inches.	Wire or hemp core.			Length of stroke—inches.	Diameter of cylinder—inches.	Speed of engines in ft. per min. when hoisting load.	Direct or second motion.		Number.	Lengths—feet.	Diameters—inches.			
1,250	1½	H.,	9	3	¶48	17	351	S.,	65	13	30	30	. . . . .	Good, . . .	53
900	1¼		6	4											
925	1		5	4											
830	1½	H.,	9	3	¶48	16	240	S.,	60	4	22	33	Oct., 1878	do. . . .	54
500	1½	H.,	6	2	30	14	300	S.,	70	12	30	36	. . . .	. . . .	55
1,000	1½	H.,	9	1	30	16	350	S.,	70	10	34	36	. . . .	. . . .	56
Chain,	. .	. .	11	. . . .	¶48	14	400	S.,	65	6	35	34	. . . .	Good, . . .	57
1,600	1½	H.,	8	1	24	16	325	S.,	65	9	31	34	. . . .	do. . . .	58
1,300	1½	H.,	8	1	¶48	16	375	S.,	65	14	30	34	. . . .	do. . . .	59
2,400	1⅜	W.,	11	1¾	¶72	18	680	S.,	70	16	30	34	1859	do. . . .	60
1,780	1⅜	W.,	11	1¾	30	16	220	S.,	70	18	30	34	1871	do. . . .	61
*450	1⅜	W.,	9	1¾	25	16	230	S.,	70	15	30	34	1868	do. . . .	62
1,900															
†450	1⅜	W.,	9	1¾	25	12	150	S.,	70	6	30	34	1880	do. . . .	63
1,100	1⅜	W.,	10	1¾	30	18	254	S.,	70	6	30	34	1880	do. . . .	64
†1,250	1½	W.,	10	¾	30	14	450	S.,	60	16	30	34	1872	do. . . .	65
800	1½	W.,	10	1	30	12	300	S.,	60	14	30	34	1874	do. . . .	66
650	1½	W.,	7	1	¶60	16	450	S.,	60	6	30	34	1880	do. . . .	67
Chain,	. .	. .	13	. . . .	¶72	18	300	S.,	60	16	30	34	1871	do. . .	68
Chain,	. .	. . .	12	. . . .	¶48	18	350	S.,	60	10	30	34	1875	do. . . .	69
2,050	1⅜	H.,	8⅝	2	¶48	16	640	S.,	70	20	30	34	1864	Nearly new	70
2,000	1⅜	H.,	10½	. . . .	¶60	18	. . .	S.,	50	8	36	34	1880	Good, . . .	71
					30	16			40	4	30	34			
7692	1⅜	H.,	8	2	¶60	18	440	S.,	75	9	28	32	. . . .	do. . .	72
	1⅜	H.,	11	1	30	16	720	S.,	75	8	36	22	. . . .	do. . . .	73
1,880	1¾	H.,	8½	1¼	60	28	270	D.	75	27	32	32	1860	do. . . .	74
‡1,500	1¾	H.,	10½	1¼	36	18	252	S.,	60	8	36	32	1875	do. . . .	75
426	1¼	H.,	6	1¼	30	12	236	S.,	85	1	12	48	. . . .	do. . . .	76
*2,000	1¼	H.,	6	2	. . .	. . .	. . .	. .	. . .	. . .	. . .	. . .	. . . .	do. . . .	77
900	1⅝	H.,	9	2	36	18	252	S.,	75	15	40	32	. . . .	do. . . .	78
960	1⅝	H.,	8	3	60	24	270	D.	70	20	32	32	. . . .	do. . . .	79
141,103	. .	. . .	. . .	. . . .	. . .	. . .	. . .	. .	. . .	952					

TABLE NO. VIII.—*Shows the number of ventilating fans erected dur*

Number of fans.	COLLIERIES.	OWNERS.	PROPORTION OF FAN.			
			Diameter—feet.	Width—feet.	Diameter of side opening—feet.	Number of side openings—feet.
1	Cranberry mines, ...	A. Pardee & Co., ...	16	5	7½	2
2	East Sugar Loaf, No. 7, . . .	Linderman, Skeer & Co., ...	16	5	7	1
3	Stout, No. 7, (Milnesville,)	Stout Coal Company, ...	16	5	8	1
4	Pond Creek, ...	Pond Creek Coal Co., (limited,) . .	15	3½	8½	1
5	Hazleton, No. 6, ...	A. Pardee & Co., ...	16	5	7½	2
6	West Cross Creek, ...	Cox Brothers & Co., ...	5	2	. . . .	2

The above table shows there were six ventilating fans erected in this district during 1830, and three more are now under way which will be included in the next year's report. Fan No. 6 is used for ventilation when sinking slope and opening out work, and will be superseded by a larger one in course of time. The H. P. of the fan engine, in either case, was not taken as we did not have an indicator to show the steam pressure in the cylinder, hence the accurate per cent. of the power utilized could not be calculated.

ing 1880 in the South District of Luzerne and Carbon counties.

NUMBER OF—				DIMENSIONS OF ENGINE				COST OF—		
Revolutions of fan per minute.	Inches of water-guage.	Cubic feet of air exhausted per minute.	H. P. in the air.	Length of stroke—inches.	Diameter of cylinder—inches.	Direct or belt-acting.	Vertical or horizontal engine.	Fan and engine.	Erection.	Tota cost.
86	1.25	42,000	8.27	18	12	D	Vertical, . . .	$900 00	†	
100	2.12	41,000	13.68	21	16	D	Horizontal, .	. . . . .	†	$1,200 00
65	0.85	30,200	4.04	24	13	D	Horizontal, .	900 00	$210 00	1,110 00
100	1.58	25,000	6.22	15	8½	D	Horizontal, .	300 00	†	*300 00
80	1.20	40,000	7.56	18	12	D	Vertical, . . .	900 00	†	
300	. . . .	5,000	. . . .	. . . . .	. . . . .	B	Rotary, . . .			

Marked thus: * Second hand fan. † Cost of erection not kept separately from other accounts.

TABLE NO. IX.—*Shows the rates of wages paid to colliery hands in the Wharton vein, (eight feet thick,) in 1880. Inside wages to advance and decline at the rate of ten per cent. on every dollar rise and fall in coal above or below five dollars, at tide.*

	Basis rates.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Mean.
Price of coal in market,	....	$3 50	$3 50	$4 10	$1 30	$4 3)	$4 30	$1 30	$4 30	$1 50	$4 50	$4 50	$1 50	166
Rate per cent. added or deducted,	....	.15 off	.15	.09	.07	.07	.07	.07	.07	.05	.05	.05	.05	07.83
Gangway per yard,	$4 59	$3 90	$3.90	$1 18	$1 27	$1 27	$1 27	$1 27	$1 27	$1 36	$1 36	$1 36	$1 36	$1.2 $4 23
Airway per yard, (twenty-five square feet,)	3 06	2 60	2 60	2 78	2 85	2 85	2 85	2 85	2 85	2 91	2 91	2 91	2 91	2 82
Cross-cut per yard,	2 30	1 96	1 96	2 09	2 14	2 14	2 14	2 14	2 14	2 19	2 19	2 19	2 19	2 12
Opening breast,	8 50	7 23	7 23	7 74	7 91	7 91	7 91	7 91	7 91	8 08	8 08	8 08	8 08	7 84
Gangway per yard, (B vein twelve feet thick,)	4 5	3 87	3 87	4 14	4 23	4 23	4 23	4 23	4 23	4 32	4 32	4 33	4 32	4 19
Price per two and a half ton car, (B vein,)	91.4	80.3	80.3	86.1	87.8	87.8	87.8	87.8	87.8	89.7	89.7	89.7	89.7	87.1
Price per two ton car, (D vein eight feet thick,)	97	82.5	82.5	88.3	90.3	90.3	90.3	90.3	90.3	92.2	92.2	92.2	92.2	89.4
Price per ton, Wharton,	48¼	41.3	41.3	44.1	45.1	45.1	45.1	45.1	45.1	46.1	46.1	46.1	46.1	44.7

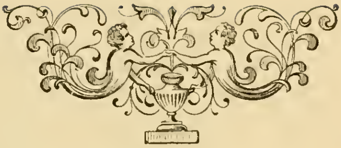
Average price of coal per ton in market, at which miners were paid in 1830, was $4.2166; in 1879 it was $3.0416; difference or increase, $1.175, equivalent to .386 per cent.

TABLE NO. X.—*Shows the rates of wages paid to colliery employés working in the Mammoth vein, (30' thick.) Inside wages to advance and decline at the rate of ten per cent. on every dollar rise and fall in the price of coal above and below five dollars at tide.*

	Basin rates.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Mean.
Price of coal in market, ...	$5 00	$3 50	$3 50	$4 10	$4 30	$4 30	$4 30	$4 30	$4 30	$4 50	$4 50	$4 50	$4 50	$4.2166
Rate per cent. added or deducted, . . .	. . .	.15	.15	.09	.07	.07	.07	.07	.07	.05	.05	.05	.05	.783
Gangways timbered, per yard, ...	$6 12	$5 20	$5 20	$5 57	$5 69	$5 69	$5 69	$5 69	$5 69	$5 81	$5 81	$5 81	$5 81	$5 61
Gangways not timbered, per yard, . . .	5 31	4 54	4 54	4 87	4 98	4 98	4 98	4 98	4 98	5 07	5 07	5 07	5 07	4 92
Chutes, per yard, ...	2 87	2 41	2 44	2 61	2 67	2 67	2 67	2 67	2 67	2 73	2 73	2 73	2 73	2 64
Cross-cuts, per yard, ...	1 91	1 62	1 62	1 74	1 78	1 78	1 78	1 78	1 78	1 81	1 81	1 81	1 81	1 76
Air-ways, per yard, (25 square feet,) . .	3 25	2 76	2 76	2 96	3 02	3 02	3 02	3 02	3 02	3 09	3 09	3 09	3 09	3 00
Opening breast, (allowance of $15,) . . .														
Cross-holes from gangway to air-way, .	3 83	3 26	3 26	3 49	3 56	3 56	3 56	3 56	3 56	3 64	3 64	3 64	3 64	3 53
Price per two-ton car for coal, ...	0 85	0 72	0 72	0 77	0 79	0 79	0 79	0 79	0 79	0 81	0 81	0 81	0 81	.784
Price per ton, (48 cubic feet to the ton,)	0 42½	0 36	0 36	0 38½	0 39½	0 39½	0 39½	0 39½	0 39	0 40½	0 40½	0 40½	0 40½	.392
Miners, per week, ...	12 69	10 71	10 71	11 47	11 72	11 72	11 72	11 72	11 72	11 97	11 97	11 97	11 97	11 62
Miners' laborers, per week, 1st class, . .	10 80	9 18	9 18	9 48	10 04	10 04	10 04	10 04	10 04	10 26	10 26	10 26	10 26	9 95
Miners' laborers, per week, 2d class, . .	9 90	8 42	8 42	9 01	9 21	9 21	9 21	9 21	9 21	9 41	9 41	9 41	9 41	9 13
Gangway laborers, per week, ...	11 53	9 80	9 80	10 49	10 72	10 72	10 72	10 72	10 72	10 95	10 95	10 95	10 95	10 62

Rates of wages paid to the following hands during month of June, 1880, compared with that of 1879.	Per month.	
	1880.	1879.
Breaker bosses, ...	$60 00	$60 00
Engineers, ...	54 00	48 60
Fireman, ...	45 00	42 12
Dispatcher, ...	50 00	50 00
	Per	day.
Blacksmiths, ...	2 00	2 00
Carpenters, ...	1 60	1 50
Platform men, (breaker,) . . .	1 25	1 15
Chute men, (breaker.)	. . . .	1 00
Slate pickers, best, 85 cents to $1 per day. Boys, 30 to 60 cents per day.		

Miners, working in flat places, are paid from five to six cents per ton for "buggying" the coal from the breast to the gangway. The miners get the coal they mine with the yardage. The average price of coal per ton in 1880 was $4.2166, and in 1879 it was $3.0416, making an average rise of $1.175=0 3:6 per cent. The average increase in wages for 1880 over that of 1879 was about twenty-seven per cent., and the increase in wages in December, 1880, over that of 1879 was twenty per cent.



RJ Horace